Bicycling Bliss

Riding to Improve Your Wellness

Portia H. Masterson

Self-Propulsion Publishing
Golden, Colorado

Disclaimer

Information in this book is for educational and instructional purposes based on the research and experience of the author. It is intended to complement medical care and not replace it. *Bicycling Bliss* does offer many suggestions to improve your wellness. But remember it is your responsibility to tune in to your body's response and determine if the exercises and practices benefit you. Pain is your body's signal that something is wrong. Don't ignore it. The publisher and author are not responsible for any adverse effects or consequences resulting from the use of any of the suggestions or procedures discussed in this book.

Bicycling Bliss: Riding To Improve Your Wellness
Copyright © 2004 by Portia H. Masterson

All rights reserved, including the right of reproduction or transmission in whole or part in any form without written permission of the author.

Shimano is the registered trademark of Shimano, Inc.

First edition: May 2004
ISBN 0-9753868-0-8

Library of Congress Cataloging-in-Publication applied for.

To purchase additional copies, e-mail portia@bicyclingbliss.com or visit our website at www.bicyclingbliss.com

Self-Propulsion Publishing
P.O. Box 16334
Golden, CO 80402-6006 USA

Editor: Elizabeth Gold, ElizGold@aol.com
Interior design: Char Campbell, Desktop Publisher
Cover design: E. Magine & Assoc., Mona Simon
Cover photo: Jim Yost Photography taken at Red Rocks Park, Morrison, Colorado
Drawings: Pat Conrad, Susan Hart, Ted Rains, and by permission of H. David Coulter
Photographs: Jim Yost; Bernhard, Kirk, & Portia Masterson; and Brett Butler
Printed in the U.S.A. by United Graphics, Inc.

Balanced Muscle Alignment and Reduced Tension Enhance Riding Comfort and Control

- Paying Attention to What Feels Good and What Doesn't Will Keep You Riding with Enthusiasm
- The Influence of Riding Position on Your Cycling Experience
- Comfort, Relaxation, and Bike Handling Skills Are Interrelated
- Origins of Cycling Discomfort
- Creating and Maintaining Cycling Comfort

Paying Attention to What Feels Good and What Doesn't Will Keep You Riding with Enthusiasm

Many riders measure their riding satisfaction in terms of distance or speed or by comparing their stamina to the performance of their riding companions. These criteria have several drawbacks. For one, focusing on end goals tends to diminish sensitivity to your ever-changing physical, mental, and psychological conditions, making it more difficult to adapt to your true needs. Rather than improving your fitness level, you are more likely to over-train or lapse into sloppy and often harmful riding forms. By shifting your focus to the process of riding, you will feel renewed by the satisfying movements of your body, by revitalizing diaphragmatic breathing, and by tuning in to your natural surroundings.

Widespread acceptance of abusive riding styles damages the health of riders and the image of cycling. Many riders persevere toward their goal until they hurt. Their discomfort may be caused by not fueling themselves for sustained endurance or by not wearing appropriate clothing to protect them from the weather. Some people accept crashing and injuries as an unavoidable part of riding. What motivates these riders to willingly compromise their health? I have posed this question to customers in an effort to understand the causes of self-abuse in recreation. Some of their explanations may help you identify old, unhealthy habits of your own. Look through this list of responses that offers some of the reasons why cyclists abuse themselves:

- They pursue exercise and recreation with the same compulsion they pursue their careers: with immoderate drive and with unsupportive companions.

- Some people fail to distinguish their personal riding priorities from the all-out performance of professional athletes. Racers are inclined to justify damaging their health for the compelling goals of winning and professional advancement.
- The influence of our Puritan ancestors contributes to our feeling guilty about pleasure.
- Childhood abuse makes it difficult to recognize abusive behavior as adults.
- They believe the jingle: no pain, no gain.
- Some people have a serious disconnect between head and body. Their life styles require a lot of mental activity and create so much tension that sensitivity to bodily needs is easily lost.
- Residual emotional pain as well as chronic muscle tension set up the tendency to ride beyond a comfortable level in an effort to experience feeling in an otherwise numb body or existence.
- They feel guilty if they don't meet some idealized physical image.
- Some fear that others will interpret self-nurture as weakness.
- Perpetual sleep deprivation, which is prevalent in today's society, impairs judgment.
- Advertising says it is cool to smoke, to participate in extreme, high-risk sports, and to eat junk food. This causes people to feel inadequate the way they are. The message is hammered home that being part of sensational activities and consuming harmful products is what counts.

It is my hope that by learning to tune in to your riding form and your total condition that you will be able to identify abusive riding styles and purposely choose healthful and nurturing alternatives.

The media and the Internet are full of misinformation about cycling. Riders would be more likely to improve their fitness in wholesome ways if cycling experts provided accessible health-based cycling information. On one extreme you will find advice for competitors about how to win, and on the other is superficial advice for beginners that sounds like "Cycling for Dummies." Neither body of information credits the reader with critical intelligence or makes it fun and easy to learn new techniques. All of this information needs to be adapted to the needs of recreational riders who want to improve their general well-being by riding.

The bicycle industry and media target a narrow market of high risk, trend-obsessed riders. Their preoccupation with equipment, competition, speed, and extreme riding styles obscures the pleasures of cycling from many people. If you are a bicycle commuter, a self-contained tourist, a woman, a differently-abled rider, or a strong older rider, you may have

difficulty finding appropriate products and receiving respectful service. Elitist and exclusive attitudes in specialty bicycle stores are a further deterrent. Certainly more riders would evolve into cycling enthusiasts if they were greeted with acceptance and respect in their search for products and information. It is my genuine hope that *Bicycling Bliss* will support riders in developing satisfying, personal riding styles independent of these challenges.

Another reason enthusiasm for cycling is not reaching its potential is the lack of comfortable equipment. Bike and component manufacturers focus a disproportionate amount of time and resources on developing products for competitors rather than for non-competitive, pleasure riders. This means the selection of mid-range bikes ($600-$800) for health and fitness riders is sadly neglected.

The Influence of Riding Position on Your Cycling Experience

In recent years, the shape and physical condition of U.S. citizens have changed dramatically. Waistlines have expanded, and tension, discomfort, and injury in the neck, shoulders, and back have become commonplace. At the same time, the top tubes of bicycle frames have become longer, and stems have pushed handlebars lower and farther forward requiring riders to bend forward about 45 degrees with fully extended arms. This position intensifies the chronic muscle tensions riders bring to their bikes from high-pressure life styles. Leaning and reaching so far forward also impairs breathing by confining the chest and diaphragm. As one of our customers with ample girth and large breasts exclaimed, "Designers just don't understand that breathing is not optional when you ride a bike!" These health and design trends have made cycling increasingly uncomfortable and discourage many riders from riding regularly.

These bike designs challenge fun-loving, health-seeking riders. Saddle discomfort increases as the perineum is pressed firmly against the saddle. Weight and pressure on the hands increases, and the upper trapezius (muscle at the top of your shoulders) must contract continually to extend the arms forward. Contracted shoulder muscles combined with hyper-extended necks is a sure formula for upper back and neck pain.

Riding with more than a 45-degree forward lean can make bike handling more challenging. On descents, it places too much weight over the front wheel, increasing the risk of going over the handlebars. It also makes it difficult for riders to shift their weight by moving their buttocks off the back of the saddle because their arms are already fully extended. Generally speaking, the mobility of riders on their bikes is reduced by this stretched out position, making weight shifts and control more difficult.

These problems would be diminished by changing the bike setup. Bringing handlebars closer to the rider's shoulders eliminates neck, shoulder, and wrist discomfort aggravated by the bike. There are three dimensions to consider when adjusting the handlebar grip position: height, distance from the saddle, and width of the bars. Even though bikes are

designed with height adjustment in the seat posts, few bikes allow the stems to adjust the handlebar position for individual comfort needs.

You may wonder if this design requiring a forward lean of more than 45 degrees dramatically increases riding performance since manufacturers create so many bikes that require it. For the same degree of forward lean, bike handling is actually improved by bringing the handlebars close enough to the rider's shoulders to allow the elbows to flex. The closer the flexed elbows come beneath the shoulders, the more relaxed the upper trapezius can be during dynamic riding. Flexed elbows increase the rider's agility on the bike and facilitate control by weight shifts. This change in arm position has little effect on your weight distribution over the wheels since the forearms are a small percentage of total body weight.

Then you may question further, if flexed elbows actually improve bike handling and control, could it be that this change in arm position diminishes your ability to generate power? Biomechanically, the large buttocks muscles work more effectively with the pelvis tilted forward at 30 to 45 degrees. The closer the pelvis comes to a vertical position the less active these large muscles are. For riders who want maximum power output, the 45-degree pelvic tilt is a wise choice. For recreational riders who place a higher value on comfort and renewal, a more upright position is more comfortable.

The distance between the saddle and the handlebars influences mobility and comfort but does not dictate the rider's position. All riders can use their elbows to raise and lower their torsos to adjust their position to riding conditions. They can sit more upright to see and be seen better or to enjoy a change in position. They can lower their torsos and tilt their pelvises forward to increase power output, to assume an aerodynamic position, and to move their weight along the length of their bikes to increase traction during steep ascents.

Now you can see that the forward tilt of the pelvis influences your potential power output and the forward lean of the torso influences bike handling. However your hand and arm positions are a matter of personal preference. This means that when you select a bike or modify your current bike, the frame should fit your body proportions whereas handlebar position should be customized to your personal desire. Your frame size and riding position are separate but interrelated issues.

The three illustrations that follow represent a continuum of riding positions from upright to a forward lean of more than 45 degrees. These positions represent the full spectrum of riders' positions as well as the possible evolution of an individual rider's form. Where does your current style fit in the continuum? Weigh your priorities against the benefits and detriments when you evaluate your bike setup and your riding position.

Benefits of the Dynamic Position

- Dynamic bike handling
- Distribution of weight over both wheels
- Complete body workout
- Greater ability to generate power
- Lower center of gravity/ more stability
- Aerodynamic efficiency
- Enhanced control of your bicycle by shifting your weight
- Faster response when necessary to change direction or speed
- Enables full use of torso to control bike and for propulsion

Detriments of the Dynamic Position

- More pressure on the perineum and hands
- Increased neck strain from hyperextension
- Increased tension in shoulders
- Discomfort in upper back from neck and shoulder tension
- Increased lower back strain at high power output
- Decreased ability to see and be seen by traffic
- Impaired circulation through the groin

Vertical | **30 to 45 degrees forward** | **More than 45 degrees**

Illustrations by Susan J. Hart

Static Style

Energy style: casual

Suitable for road & bike path

Percentage of weight on rear/front tires: 70/30

Versatile Style

Energy style: moderate power output

Suitable for road, paved & dirt trails

65/35

Dynamic Style

Energy style: high energy output

Suitable for road & all trails

60/40

For a detailed discussion of the physical factors that influence your choice of position, refer to Chapter 5, “Optimum Use of Your Back,” p. 219. However, there are some equally important subtle factors you will want to consider in choosing your riding position.

Comfort, Relaxation, and Bike Handling Skills Are Interrelated

If you try to adapt your position to the demands of a particular bicycle, you risk diminishing your riding performance and your development as a rider. Your bike should be modified to meet your current preference rather than you adapting to the current bike setup. It is important to understand the subtleties of choosing a riding position so you will not be dissuaded from your best choice by well-meaning friends, sales staff, or your reluctance to spend the money to modify your bike. Neglecting to modify your bike setup and to optimize your position will unwittingly sabotage your development as a cyclist or diminish the healthful benefits of riding.

While I was learning to ride a unicycle, I discovered that relaxation is the key to controlled movement. You steer a unicycle primarily with the hips. In the beginning it was quite obvious that fatigue and stress made my spine and hips tense and rigid so I had difficulty getting on and turning. To counteract this rigidity, I learned to take a moment before starting to ride to breathe diaphragmatically and swing my hips side-to-side to limber up my spine and hip joints. By reducing tension and increasing my flexibility, my unicycle riding skills developed quickly.

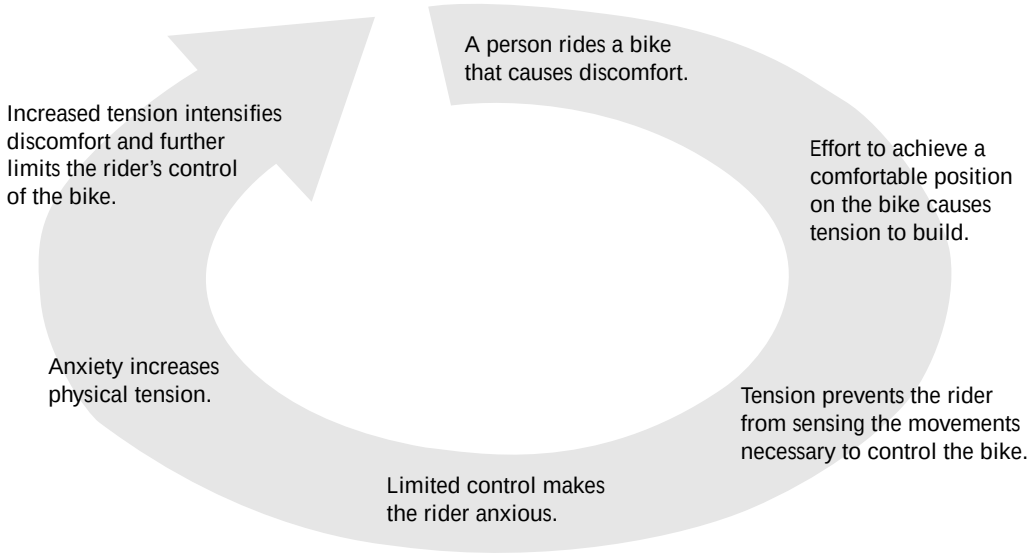
Transferring my unicycle experience to bike riding, I realized that tense riders have limited control because instead of moving freely and letting their bodies respond intuitively to their bikes, they are rigid and must think through each movement to guide their bikes. They end up steering primarily with their handlebars rather than by the fluid movement of their hips and shoulders.

Tension can result from either mental or physical causes. My unicycle experience was caused by my stressful life style: managing a small business, precarious financial condition, and the demands of single parenting. But tension can also result from enduring discomfort. The relationship of discomfort, tension, and control can be a troubling circle.

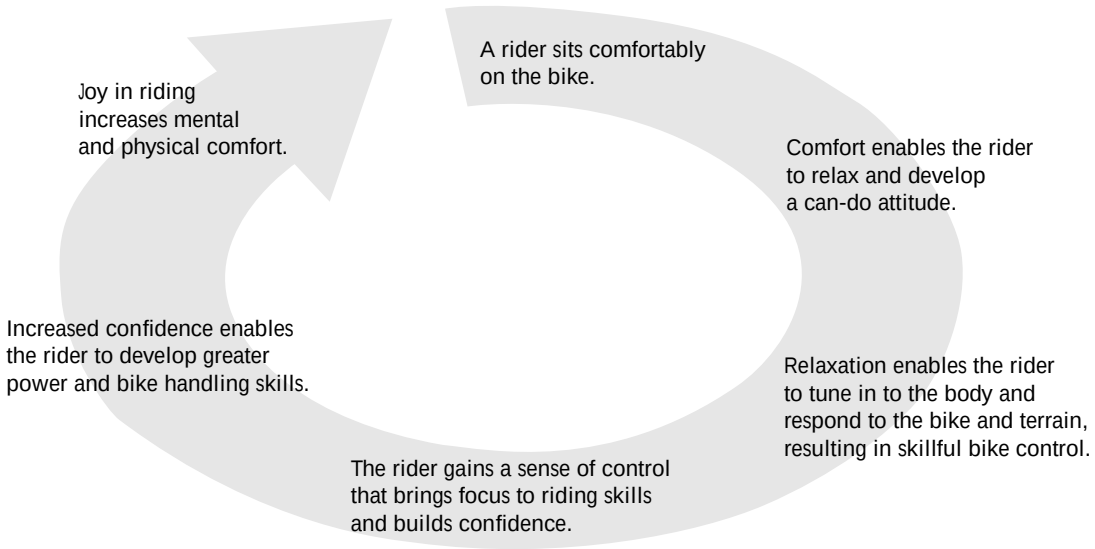
Modifying the bike setup, understanding good riding technique, and reducing life style stresses will help break this vicious cycle. But just modifying your bike setup can make a substantial contribution to your bike handling skills and to building your confidence. Comfort, relaxation, and bike handling control are interdependent and form the foundation of cycling pleasure.

Contrast the discomfort-tension cycle below with the pleasure cycle of riding a bike that is set up for your personal comfort.

The Discomfort-tension-poor-control-anxiety Cycle



The Comfort-relaxation-control-pleasure Cycle



Since comfort is the key to relaxation, bike handling skills, and pleasure in cycling, what are the causes of discomfort and how can we eliminate them?

Origins of Cycling Discomfort

Why do riders who have ridden a bike with comfort and satisfaction lose that satisfaction after years of pleasure riding? Why do some riders have their bikes set up just the way they like them but still continue to be uncomfortable? The answer is because nothing is as simple as it first appears. The underlying causes of rider discomfort require a commitment to health and fitness excellence – the basic elements needed to create bicycling bliss. Key causes of discomfort are:

1. Most stock bikes must be modified to accommodate individual body proportions, desired riding position, and sensitivities due to overuse or injury.
2. Most riders are untutored and ride with poor technique.
3. Too frequently cyclists ride beyond their conditioned stamina level and fail to respond to fatigue.
4. All people move in habitual patterns that create musculoskeletal imbalances and tensions.
5. It is normal in our society to live with excessive stress, intensifying subconscious anxiety, and unresolved emotional burdens that result in chronic body tension.

Let's consider each of these factors in detail.

1. Most stock bikes must be modified to accommodate individual body proportions, desired riding position, and sensitivities due to overuse or injury.

If you have long arms, you may like your handlebars farther from the saddle. If you have a short torso, moving your handlebars closer will make you more comfortable. Use the guidelines for bike fitting in Chapter 6 to help you identify appropriate modifications to your bike to accommodate your body proportions.

Physical injuries also contribute to cycling discomfort. Although car crashes are frequently the cause of these injuries, many others are from high-risk sports activities. If you are past 50 years old, it may be comforting to know that physical impairments are not necessarily age related. Shoulder problems are as likely to originate from snowboard crashes as from misuse injuries that become apparent in later years. Set up your bike to protect these sensitivities while you work on resolving them.

2. Most riders are untutored and ride with poor technique.

The old adage that you never forget how to ride a bike refers only to balancing.

The bike Richard selected for commuting has an unusually short head tube. Installing a tall stem brought him up where he could see and been seen better in traffic.

Carolyn rides for fitness several times a week, year-round. She enjoys the comfort of an upright position but wants plenty of clearance over the top tube. A small frame with extra long seat post and stem achieved these goals. She likes the hand position on wrap around classic touring bars.

Caitlin had a severe neck injury while Alpine skiing as a girl and had several cervical vertebrae fused. She came to us after a fruitless search for a performance road bike that let her sit upright. We selected a small frame with short top tube and installed a tall stem and riser bars to accommodate her needs. This is how she looked as she bought her bike. During the next few weeks, riding upright strengthened her neck and increased her confidence so she began to lower the handlebars, improving her ability to handle the bike skillfully.

The truth is that most adults remain untutored about riding technique. In Chapter 5, "Riding Style Modifications Optimize Comfort, Efficiency, and Wellness," you will learn which muscles and movements propel you forward and how to balance muscle use. But let's look at two common causes of discomfort, one due to muscle imbalance in the lower back and the other due to nerve impingement in the upper back and neck.

Lower back discomfort is aggravated by an imbalance in power output on the downward and upward strokes of the pedals. The gluteus maximus muscles of the buttocks originate at the top of the pelvis and lumbar spine of the lower back. They are the primary extensors of the hip and are used to push the pedals down. The powerful iliopsoas muscles (iliacus and psoas major) are active on the upward pull on the pedals. They are deep in the pelvic bowl and also attach to the pelvis on the inner surface of the ilium and the lumbar spine, respectively. Their contraction pulls forward to where they attach to the upper femur. Premature fatigue and discomfort in the lower back are often the result when the upward pull on the pedals, which pulls the top of the pelvis and lumbar spine forward, is not balanced by the downward stroke, which pulls them back. Refer to the illustrations in Chapter 5, pp. 188-189.

A common cause of neck and upper back discomfort is drawing the shoulders up in a shrug and dropping the head and neck forward. This creates an extreme neck curvature while the surrounding muscles are contracted. The resulting tensions compress the nerves that innervate the hands as they pass from the neck through the shoulders and into the arms and hands causing tingling, numbness, and pain in the wrists and hands. In cycling, knowledge is power.

3. Too frequently, cyclists ride beyond their conditioned stamina level and fail to respond to fatigue.

Even when you have learned to ride with maximum efficiency and control, you are likely to lapse into poor form when fatigue or distractions overtake you. You can maintain optimum form and avoid injury by adjusting your ride plans to your current condition. If you persevere to reach your goal without responding to your body's messages of fatigue, you are certain to become uncomfortable.

4. All people move in habitual patterns that create musculoskeletal imbalances and tensions.

We all move in habitual patterns. Perhaps the most common is extending the head forward so the cervical spine no longer maintains its natural curvature. Certainly this results from working at desks and carrying the heavy burden of responsibilities. Eventually this abnormal head carriage leads to tight muscles in the back of the neck and weak

muscles at the front. When you get on your bike with these conditions, you further exaggerate this distortion. The chronically tight muscles are weakened since they no longer have full range of contraction. When you start riding your bike, and your usual head carriage is abnormally far forward, the muscles at the back of your neck strain to hold your head up. Soon discomfort or pain results. In contrast, if you regularly release your head and neck upward, maintaining your natural cervical curve, you will rarely have neck discomfort on or off your bike. Chronically tight muscles in one part of your body are not an isolated phenomenon but predictably result in compensating tension somewhere else.

Even after acknowledging these sources of discomfort, you may still be reluctant to accept the idea that cycling is not the primary cause of discomfort on your bike. Yes, you probably first notice these discomforts on your bike but that is because your upper body remains fairly static on your bike and because pedaling is highly repetitive, using the same muscles without much variation. Consequently, any tensions or sensitivities caused by daily pressures or misuse are aggravated by riding and manifest as discomfort or even pain while you ride. At this point you can no longer disregard the problem and assume the pain is caused by cycling since you first noticed it on your bike. Instead, you need to search for the underlying causes of chronic muscle tension in your daily movement patterns and in the sources of stress and anxiety in your life.

5. It is normal in our society to live with excessive stress, intensifying subconscious anxiety, and unresolved emotional burdens that result in chronic body tension.

Personal experience convinced me that daily tension causes discomfort on my bike. I first became bothered by neck discomfort on long rides about the time I began writing *Bicycling Bliss* and spending long hours at the word processor. During this time my neck and shoulders were stiff with limited range of movement. I concluded it was caused by the self-imposed discipline of spending every spare moment on my writing and by holding myself in the same immobile position at the computer for hours at a time. I suspected that the tension I created at the word processor transferred to my bike, intensifying neck discomfort and pain. I found some relief from Rolfing and massage.

One morning as I was riding home from Rolfing and enjoying my freedom from discomfort, that sharp discomfort suddenly hit me in the neck. This really disturbed me since I knew I was relaxed and properly aligned. The discomfort struck just as I set my writing goals for the day. That was a physical response to self-imposed pressure I had experienced many times before. So I gave myself a brief lecture that I could only write as much as focus and inspiration permitted and that pressuring myself would only fog my mind and give me a pain in the neck. To my delight, the sharp discomfort in my neck left as abruptly as it had come!

If taking full responsibility for your physical discomfort makes you unhappy, the good news is that if you caused the problem, you can also eliminate it. Remember, accepting responsibility does not mean blaming yourself, it only means acknowledging your part in creating the problem. All people who live with the pressures of high-tech urban living will have to deal with tension related discomforts eventually. If you live in a human body, I strongly recommend that you purchase and study Dr. John Sarno's book, *The Mindbody Prescription: Healing the Body, Healing the Pain* (1998). Dr. Sarno is a specialist in rehabilitative medicine. Early in his practice (1965), he observed that medically accepted treatments for back pain did not result in predictable outcomes. Many years of research resulted in his identifying Tension Miositis Syndrome (TMS) and developing a treatment. *Miositis* refers to the changed state of the muscle tissue. (Sarno, *Mind Over Back Pain*, 1982, p. 15) Chronic muscle tension constricts blood and lymph vessels that nourish and cleanse the involved muscles. This results in an inadequate supply of nutrients, especially oxygen, and the accumulation of chemical waste products. Muscle spasms, nerve pain, and trunk deformities follow.

The most common areas affected by TMS are the upper, outer buttocks, the top of the shoulders, and sides of the neck. These common tensions affect nerves of the lumbosacral plexus in the lower extremities and the brachial plexus in the upper extremities. (Sarno 1982, p. 64.) Refer to the illustrations on p. 167, p. 244. Continued damage results in burning, numbness, tingling, and weakness. Surely you are familiar with these problems. You may recognize another characteristic of TMS where the patterns of pain move to various parts of the body and recur with increased frequency over the years, progressively interfering with life style and physical activities. (Sarno 1982, p. 15)

Though we tend to assume that these pains are caused by some physical incident, the root causes of TMS are psycho-physiological rather than musculoskeletal. (Sarno 1982, p. 50) The pain is our mindbody's distraction technique to obscure emotions our subconscious deems totally unacceptable. The underlying emotions are usually associated with our needs to be responsible, achieving, or strong in order to win love, approval, or admiration. Some personality types are prone to anxiety based on being overly conscientious, responsible, hardworking, and often compulsive. (Sarno 1982, p. 50) This is not to say these people are making these problems up but rather that their self-imposed drives create anxiety and manifest as physical tension. If these people are inclined to suppress their emotions or "put things out of their minds," the emotions relocate to the subconscious where they create anxiety and ultimately some physical disorder. (Sarno 1982, p. 53)

Placing the sources of anxiety and anger before us helps us realize their impact on our inner mind. Making a list of all the pressures in our lives and anger left over from childhood can help us identify and deal with these sources of pain. Consciously working through these emotions will reduce their negative effect in the subconscious. (Sarno 1998,

p. 146) By experiencing the emotions at the root of the pain, the mind no longer benefits from the distraction technique of creating pain, and the pain goes away. This is where a properly trained psychotherapist is needed.

Knowledge therapy is the primary treatment for TMS. Understanding the mechanism, identifying the causes of emotional distress, being confident of the harmless nature of the physical condition, and becoming a participant in healing are most important in overcoming TMS. (Sarno 1982, p. 93-94) Non-compulsive exercise is a valuable secondary treatment as it increases circulation while stretching lengthens contracted muscles. Fortunately all living beings have elaborate healing mechanisms built in. The best therapy is to recognize and unleash our great capacity of self-healing. (Sarno 1982, p. 82)

Of course when you experience pain it is necessary to eliminate the possibility of physiological disorders. But contrast the impact of the diagnosis of TMS with that of most pain sufferers. The diagnosis of TMS is knowledge-based and supportive. The sufferer is reassured of the harmless nature of the physical pain. With understanding, you can replace fear and anxiety with confident participation in the healing and self-restoration process. However, in the typical scenario of a person's first visit to most doctors, anxiety is intensified by a diagnosis that calls chronic muscle tension a chronic degenerative musculoskeletal problem and the ultimate threat of surgery. Just imagining the pain, expense, and prolonged disability anticipated with this diagnosis causes TMS to worsen. When TMS is diagnosed early, recovery occurs in four to eight weeks. (Sarno 1982 p. 98-99) Treatment depends on thwarting your brain's distraction strategy, which can be accomplished by:

- Repudiation of any structural diagnosis that there is a physical reason for the pain and knowing that TMS is a different physical process
- Acknowledgment of the psychological basis for the pain
- Acceptance of the psychological explanation and all its ramifications as normal for healthy people in our society (Sarno 1998, p. 141-142)

The resolution of your pain does not require that you remove the pressures and emotions that cause them but that you accept how the mind communicates with and affects the rest of the body. The conscious mind communicates with the unconscious. The more forceful that communication, the greater the effect. Contemporary research demonstrates how the mind communicates with the body and affects healing. (Sarno 1998, p. 145) Whenever TMS pain occurs, you might say "Okay, I don't like the situation I'm in but I'm not going to let it go to my pain area." Or "My (fill in your pain area) is acting up. What's going on in my life or in my mind to make it hurt?" The goal is to change the unconscious mind's reaction to emotional states.

John Sarno's work is important for cyclists because it confirms and expands in detail the premise that chronic cycling discomfort among recreational riders is caused by life style choices that increase anxiety and emotional distress. You can choose whether to establish your priorities and base your life style choices on them or to allow your choices of how you think, use your body, eat, sleep and exercise set your priorities.

Creating and Maintaining Cycling Comfort

Fortunately, resolving the causes of cycling discomfort leads to life style changes that transform the quality of your health and fitness. The first steps are specific to cycling but for optimum results you will need to learn how your body, mind, and spirit work together and to increase your sensitivity to their interactions. Refer to "Vital Energy" in Chapter 4, p. 142.

The essential steps to cycling comfort are:

1. **Set up your bicycle so you can maintain a relaxed riding position.** This is the easiest step to implement and ensures that you are not aggravating tension on your bike. Refer to the details in Chapter 6, "Customized Bike Setup Supports Riding Style."
2. **Retrain your body for optimum riding technique.** This one may involve years of increasing awareness and rewarding self-discovery. Refer to Chapter 5, "Riding Style Modifications Optimize Comfort, Efficiency, and Wellness."
3. **Institute a daily stretching, strengthening, and conscious breathing practice.** This will enable you to bring a relaxed, balanced body to your riding. Refer to Chapter 4, "Tools for Integrated Wellness."

The following steps would be a basic beginning for improving your cycling comfort:

1. Simplify your life to provide time and energy to make the above changes. Consciously remove clutter from your life to enable you to see the realities more accurately.
2. Select life goals as the basis for your life style choices that will ensure health and fitness excellence.
3. Seek out instruction on retraining your body for balanced use from Chapter 4, "Tools for Integrated Wellness" and the recommended readings.
4. Quit your job and escape with your loved ones to a pastoral setting and commit your lives to sustainable living and bicycle riding. Oops! That's probably not too realistic.

Conclusion

Your search to improve your cycling comfort is an opportunity to increase your awareness. Most chronic discomforts that you experience on your bike can be resolved by

addressing your underlying anxieties and by corrective exercises that will develop your awareness of healthful equilibrium. With practice, your increasing awareness and sensitivity to discomfort will enable you to identify sources of tension, causes of overuse, injury, and the onset of inflammation in their initial stages. Taking preventative measures in a timely manner will help you avoid injury before severe damage is done.

Chapter 4, "Tools for Integrated Wellness," introduces you to methods for understanding your life as a fascinating, complex entity. The effort you invest in increasing your knowledge of your patterns of response to life's situations will be a source of revelation and amusement. Lighten up, hang loose, and have more fun!

Tools for Integrated Wellness

- Expanding Your Understanding of Wellness
- Effective Breathing Integrates the Mindbody and Optimizes Performance
- Establishing a Moderate-intensity Aerobic Exercise Routine
- Alexander Technique
- Understanding Yoga Postures and Stretching
- Strength Training for Building Balanced Bodies
- Empowering Yourself with Affirmations and Visualizations
- Journaling for Reflection and Quieting Your Mind
- Beginning a Meditation Practice
- Responding to Seasonal Change
- Some Basics on Massage
- Pressure Point Therapy
- Vital Energy
- Practicing Tools for Integrated Wellness Will Improve Your Cycling Performance

People who cannot find time for recreation are obliged sooner or later to find time for illness.
~John Wanamaker

If you have been a cyclist for many years, you probably need to broaden your fitness practices. Cycling develops excellent cardiovascular and leg strength but will create harmful musculoskeletal imbalances if you do not compensate with regular stretching and strengthening exercises. Fitness experts agree that optimum physical fitness and athletic performance depend on physiological balance created by a program that integrates these four fitness categories:

cardiovascular
stretching
strengthening
balance/agility

The exercises and body use techniques presented in Chapters 4 and 5 of *Bicycling Bliss* provide you with practices in these four categories. These are needed to achieve balanced physical, psychological, and spiritual fitness. Here is a summary of these categories and their functions:

1. Vigorous, sustained exercise develops the heart, respiratory, and circulatory systems by elevating your pulse rate. On a more subtle level, cardiovascular fitness requires body alignment and freedom from tension to allow you to inhale and exhale to full lung capacity. Understanding the mechanics of breathing and how to breath effectively are just as important to health as developing cardiovascular strength.
2. Stretching exercises elongate your muscles and release tension that interferes with effortless movement and the full contraction of opposing (antagonistic) muscle groups.
3. Strengthening exercises develop your muscle contracting capacity and balance the strength of opposing and supporting (synergistic) muscles and muscle groups.
4. Balance and quick, appropriate recovery response depend on the coordination of mental and physical alertness, freedom from tension, flexibility, and equalized flow of energy throughout your body. Mind and body must be fully integrated. Joints must be surrounded by muscles balanced both in strength and freedom from tension enabling full range of motion. Vital energies must flow equally to all parts of the body.

This chapter provides basic understanding of practices and programs to help you attain integrated fitness and health. Chapter 5 instructs you in specific exercises to benefit each part of your body. As you begin practicing various exercises, refer to this chapter to refine your technique.

Cycling is remarkably effective in developing and maintaining your cardiovascular system, balance, and agility skills. But if you are not already systematically performing stretching and strengthening exercises, now is the time to start. The wisdom of "use it or lose it" is so profound it is generally ignored. But if you have already lost *it*, the exercises and supporting knowledge in *Bicycling Bliss* will enable you to regain *it*. In fact, the more time you invest in cultivating integrated wellness, the more you enrich your life. Notice that time is the primary investment. Satisfaction and health benefits can be derived with a minimal investment in equipment.

As you establish a disciplined exercise program, you will need to improve your diet and balance your intellectual, social, and spiritual practices. Disregard for these key factors will limit your fitness potential. Just as your riding skills depend on parallel development of confidence, strength, and technique, your total wellness depends on simultaneous development of yourself physically, emotionally, intellectually, socially, and spiritually.

Expanding Your Understanding of Wellness

For many of us, wellness is the absence of sickness or pain. We attribute our departure from wellness to infection or injury. This limits wellness to the periods between health

problems and usually results in a passive approach to caring for ourselves. We tend to ignore our well-being until we feel lousy with infection or musculoskeletal discomfort. Often we greet our afflictions with disbelief or irritation. How could we be subjected to this displeasure or inconvenience? We may even review our recent activities or social contacts to try to identify who did this to us. As with other challenges, accepting responsibility for our condition frees us to find solutions to our problems. We can shift quickly to a proactive mode. Long-term recovery requires that we look within ourselves. We must examine our attitudes and behavior patterns to determine what we did to weaken our natural defenses and our powerful healing mechanisms.

The root of the word "health" is wholeness. Health depends on a dynamic and complex equilibrium of all the elements within our beings and our surroundings. That equilibrium is temporary as we shift back and forth from periods of relative illness to periods of relative wellness. The shifting is similar to the dynamic balance we keep when riding our bikes through obstacles — at times we lean right and at times we lean left. Sometimes we get too far out of balance and crash. So it is with health. Variations from illness to wellness are natural and to be expected. It is okay to be sick. If we are attentive and respond quickly to subtle changes on our bikes, we can maintain our equilibrium. This is also true of our health; the sooner we notice a problem, the less work it will be to correct our imbalances and return to wholeness. Unless we learn to notice and be bothered by the early subtle stages of illness or injury, we will lose the chance to manage our bodies through their changing cycles by simple means. The loss will make us more and more dependent on outside practitioners and costly intervention. (Weil, 1983, p. 58)

We can learn to minimize illness and injury. Preventative maintenance works just as effectively on ourselves as it does on our bicycles. Fortunately, the tools for maintaining ourselves are more varied, give us more pleasure, and are usually free! These tools include getting adequate sleep, reducing self-imposed pressures, eating a well-balanced diet, exercising regularly, and turning inside to nurture our subtle energies. We should start with a realistic appraisal of our health assets and deficiencies. Everybody is different, just as our facial features and body types are different. By identifying our weak points, we can work toward changing our behaviors to strengthen these areas and can recognize when they are out of balance and take early action. Learning to value our assets and appreciate them daily will maintain them and lift our moods.

The fundamental key to long-term wellness is internal adjustments to maintain balanced wholeness. We are the only ones who can tune in to these subtleties and make needed changes. No one and no product or equipment can do that for us. This requires that we personally implement preventative maintenance practices as well as take responsibility for the poor choices we have made in the past that have damaged our health.

The current disarray of the health care industry should be adequate motivation for you

to care for yourself. Although we are fortunate to have some brilliant and dedicated health care professionals, the majority are too eager to prescribe drugs or surgery. Both physicians and patients are preoccupied with relieving symptoms rather than determining the underlying causes and reestablishing wholeness by healing those imbalances. Because most people have relinquished responsibility for their well-being, ineffective and harmful medical practices continue to flourish.

Furthermore, Western or allopathic medicine is only just beginning to recognize subtle and integrated wellness and curative practices. Methods from other cultures that have been respected for thousands of years are still viewed with skepticism in the West. Dr. Andrew Weil's 1983 book *Health and Healing* offers critical and caring discussions of diverse healing traditions. Ken Cohen's *Art and Science of Qigong* criticizes the inconsistencies in measuring the effectiveness of Eastern and Western medical practices. Many accepted medical procedures used in the U.S. today are not supported by documentation that shows that they cure the problems they are applied to. In Sue Crossen's *Back Pain Breakthrough* you will find a compelling story of her search for relief from back pain and the inadequacies of the current approach to musculoskeletal pain. Many of the authors who have strongly influenced my understanding of health and fitness have broken from the status quo in Western medicine. Doctors John Sarno, John A. McDougall, and Andrew Weil developed revolutionary, effective health and healing concepts and programs after they completed their medical training in the U.S. During their residencies and early practices, they became critical of the inconsistent results from accepted medical curative methods and struck out to discover healing techniques that successfully and consistently heal the root causes of illness.

Gradually, health practices from other cultures are gaining popularity in the U.S. Unfortunately, as the postures of Yoga and the martial applications of Indian, Chinese, and Japanese healing arts become popularized in the U.S., they suffer from the same preoccupation with external aspects that limit many of our Western values. Limiting these practices to exercise alone dramatically diminishes their value. I encourage you to delve into the philosophical and spiritual teachings of these arts. They will enrich your life in meaningful ways.

Whatever our health and healing practices, there are times when it is necessary to seek professional help. Emergency and traumatic injury and illness as well as long-standing conditions require professional care. This is also true of psychological problems. Tuning in to the subtleties of mindbody health necessitates that we clear out excess emotional baggage. I have transformed the quality of my life through long-term counseling, so I am frustrated when friends are reluctant to seek professional help. I ask, "If you broke a leg would you go home and sit in the middle of the living-room floor convinced that you could heal the leg yourself?" And yet our psyches are so much more important than our legs in the search to find satisfaction and productivity in life. Why wouldn't you give your psyche

equal opportunity to heal fully? Remedial care and preventive maintenance for your body, mind, and spirit can make good health the norm in your life and enable you to intervene before any infirmity becomes incapacitating.

Perhaps it is convenience that leads us to compartmentalize our lives and treat our bodies as if they were separate vehicles. Human life is certainly one of the miracles of creation. The interactions of our bodies, minds, psyches, and spirits are fascinating *and* powerful. Our attitudes and behaviors are just as important to our health as the condition of our bodies, emotions, social support systems, dedication to learning, and spiritual resources.

Dr. Andrew Weil at the University of Arizona's Integrative Medicine Clinic has thoughtfully identified the diverse components that contribute to well-being. Regularly assessing wellness can help prevent the painful loss of healthful equilibrium. Begin by asking yourself what good health means to you. Then evaluate your physical state and identify any health problems. Critically assess your diet, activity level, life relationships, stress coping skills, family health risks, meaning in life, and contentment level. Taking the time to write your answers down can provide you with insights to improving your health and changing your life style. They will also provide a good basis for evaluating your riding style. Combining this information with a general physical check-up will give you a foundation for improving your total wellness.

As you identify what you need to improve, the next challenge is finding the will to change. Since the health of U.S. citizens has reached an alarmingly low point, you will find abundant information to persuade you of the importance of change and to sustain your motivation along the way. Structured programs are available to guide you to better nutrition and physical fitness. these make it easier for busy people to establish new habits without working through each detail. However, before you accept one of these programs critically evaluate it. Is it balanced or does it simplistically promote one group of foods while eliminating other essential nutrients? Even some of the popular programs are harmful. Andrew Weil (2000, pp. 31-33) and Walter Willett (pp. 45-48) both give credible and brief evaluations of several popular diet plans.

Lasting change will require patience, satisfaction with small increments of change, and appreciation of the subtle inner workings of change. Resist the urge to forcefully implement rapid change. I have identified three fundamental steps in the re-education process:

1. Understand what you need to achieve to improve your wellness.
2. Let go of your old habits and ideas.
3. Intentionally direct your energy toward the new ways.

Taking time and effort to work through each of these steps will make you more comfortable with your new ways. These apply to redirecting your life goals as well as to retraining your attitudes, relationships, eating habits, and athletic performance.

Effective Breathing Integrates the Mindbody and Optimizes Performance

Conscious breathing is an essential part of healing and spiritual practices in many cultures. By observing your breathing patterns, controlling your breathing, and learning to apply various breathing techniques, you can optimize your physical performance, focus your mind, alter your emotions, mitigate pain, and transform your spiritual experiences. You can increase your understanding of yourself and greatly enhance your satisfaction in life by retraining yourself to master your breathing skills.

Breathing is the bridge between our voluntary and involuntary functions. Dr. Andrew Weil clearly describes this relationship in *Natural Health, Natural Medicine*:

"The breathing function is unique in the human body. It is the only involuntary function which can also be controlled voluntarily. It is controlled by two separate sets of nerves, one belonging to the voluntary nervous system and the other to the involuntary (autonomic) system. Breathing is the bridge between these two systems. Much illness comes from imbalance in the functioning of the autonomic nervous system. Our conscious minds have no direct access to this system. There is reason to believe that by working with breathing, you can change your autonomic tone and affect many of the 'involuntary' functions. Regulating your breath can influence your blood pressure, calm a racing heart or help your digestive system. Practicing simple breathing techniques can give you influence over certain 'involuntary' functions. Increased awareness of breathing can expand your consciousness, further communication between mind and body and so improve your health."

My Personal Journey Developing Conscious Breathing Skills

As a cyclist, I had given casual attention to my breathing while riding above 10,000 ft. elevation but still found it necessary to stop often to catch my breath. I first discovered how deficient my breathing was when I was unable to follow the recommended breathing patterns in Taiji and Yoga classes. Even though I taught breathing techniques in childbirth education classes for many years, I hadn't transferred what I knew about pain mitigation by breathing to day-to-day use. I guess I thought that I knew how to breathe. Only when I began to ask questions, read, and practice breathing techniques, did I realize how dysfunctional my breathing was. Now, after seven years of steady practice, I know that conscious breathing transforms both the quality of my life *and* my athletic performance.

As I began to assess my breathing style, I discovered that there were times when my breath was shallow or erratic. Worse yet, I sometimes simply held my breath. I breathed mostly in my chest and made limited use of my diaphragm. In my effort to improve, I discovered that I was afraid of controlling my breathing. I guess I thought that I might

asphyxiate myself. As soon as I identified that fear and accepted it as part of me, I was able to leave it behind and move on to learning control. The next discovery came as I tried to use my diaphragm while riding. I did not coordinate the expansion of my abdominal muscles with inhaling. As I tried to train myself to support the movement of my diaphragm with my abdominal muscles, I often became confused. During an exhalation, I'd find myself expanding my abdominal muscles instead of contracting them. This problem is so common that it has been named: "paradoxical or reverse breathing." I could see clearly that I had a challenge to pursue! Normally, breathing is reflexive. Without training, it is usually inefficient and inadequate for optimum athletic performance. As I became aware of my faulty breathing patterns and learned to correct them at will, I discovered other benefits of diaphragmatic breathing: improved focus, increased energy, more uniform level of exertion, the feeling of contentment, and a sense of ability to deal with present and future challenges.

Will You Benefit from Developing Your Breathing Technique?

Stress is an inevitable part of modern life. Fortunately, breath control counteracts our emotional response to stress and serves as a tool to meet life's challenges with equanimity. The pressures of meeting so many daily challenges distract us, and we become tired, tense, and often obsessive. These reactions dampen our sensitivity and make our body functions erratic and inefficient. Different states of mind are actually accompanied by characteristic breathing patterns. That means we can change undesirable states of mind by altering our breathing patterns. Yes, we can consciously reduce anxiety and calm ourselves in demanding and stressful situations by conscious breathing!

Daily stress and the resulting tension and imbalance cause turmoil in our body functions. These imbalances contribute to most illnesses and many aches and pains. In times of extreme anxiety, we all have experienced digestive and elimination problems but *underlying stress* causes more subtle changes in body functions. Eventually these changes create problems, and illness finally gets our attention. In addition, tension in the respiratory system results in inadequate oxygen supply to all parts of the body — further diminishing their function even at the cellular level. Breath training is a wise place to begin improving our health since it influences every aspect of our lives.

As a cyclist, you will appreciate that conscious breathing will improve your athletic performance, facilitate relaxation, and heighten your awareness of your surroundings. You can increase your stamina, lower your breathing and pulse rates, and benefit from rejuvenation. More specifically, effective breathing moderates your riding experience so uphill climbs will not be so draining. The pleasure of gliding down hills will increase because your heightened awareness will enhance your ability to take in the details of the descent. Improved circulation helps keep your extremities warm during cold weather rides.

You can influence the quality of your sleep. You will simply enjoy riding more!

Resist the urge to skip over this instruction because you believe your breathing skills have been adequate all these years, and you have other things to think about. Breathing problems affect most of us. Breathing therapy specialists believe that at least 60 percent of U.S. citizens are dysfunctional breathers. Gay Hendricks' observations of children revealed that most children have lost their natural, diaphragmatic breathing style by the time they reach kindergarten! I have also made some disquieting observations. I often discussed breathing techniques with customers at Self-Propulsion. When they assured me that their breathing was well developed, I thoughtfully observed their breathing habits while we continued to visit. Many times I discovered they did not support their speech with adequate breath or they held their breath and then took quick, catch-up breaths to compensate. So do stay tuned, you are bound to learn something.

In Gay Hendricks' definitive book *Conscious Breathing, Breathwork for Health, Stress Release, and Personal Mastery* he lists these benefits:

Conscious breathing:

- Releases stress and tension
- Builds energy and endurance
- Contributes to emotional mastery
- Prevents and heals physical problems
- Contributes to graceful aging
- Manages pain
- Enhances mental concentration and physical performance
- Facilitates psychospiritual transformation

How Your Breathing Works

If you were asked how you breathe, you might explain that air comes in your nose, goes down your windpipe, and fills up your lungs. Your lungs oxygenate your blood, and the spent air is expelled back up the windpipe and out the nose. But what parts of your body make this miraculous oxygenation process happen? The lungs and bronchial tubes are where this process occurs but the air is moved by the work of surrounding muscles. The engine of breathing is the **diaphragm**. This dome-shaped muscle and tendon span the entire torso and separate the chest cavity from the abdominal contents. Its muscle fibers radiate horizontally from the central tendon across the top surface of the dome. The diaphragm attaches to the lower ribs and in the rear to the lumbar spine. Although it arches upward to the base of the lungs, much of its vertical height is pressed against the lower ribs. The lungs never move down that far. As it contracts, it draws downward, expanding the lower part of the lungs to fill the void. To facilitate the diaphragm's movement, the abdomen wall needs

to round out and let the abdominal contents move out of the way. As the diaphragm relaxes and returns to full height, the lungs are pushed up and contract. To expel the maximum amount of oxygen-depleted air from the lungs, the abdominal muscles must contract, pushing the abdominal organs, diaphragm, and lower lungs upward, pressing out more air. This final step is especially important during exercise.

Of course you notice that your chest also moves when you breathe. Both your rib cage and clavicle expand your lungs by their flexibility and the work of the intercostal muscles that support and control your rib cage. The lungs move up into the clavicular area by the contraction of your neck (scalenes) and shoulder (sternocleidomastoids) muscles during strenuous exertion or conscious breathing exercises.

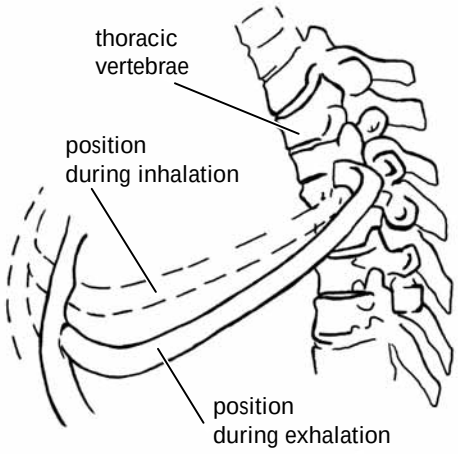
The neurological benefits from using your diaphragm are also dramatic. During active breathing, the nerves of the chest trigger the sympathetic nervous system that elicits the fight-or-flight response. In contrast, diaphragmatic breathing triggers the parasympathetic nervous system that lowers your heart rate and has a calming effect. Using conscious, diaphragmatic breathing enables you to enjoy high energy cycling and contentment *while* you ride and rejuvenation *afterwards*!

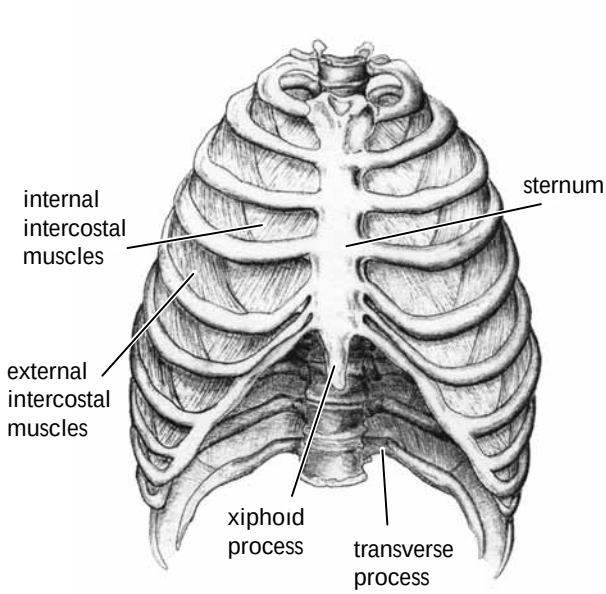
Regaining Your Natural Breathing Skills

You can better appreciate your own need to retrain your breathing technique by evaluating your day-to-day breathing habits. Observe the rate and depth of your breathing at work, at home, and while doing errands. Do you notice that in some situations you breathe faster, for example, before or while you are giving a presentation? If you often feel breathless, are you holding your breath? Do you yawn or sigh often? When you take a deep breath, does your chest expand? During high exertion, do you gasp for breath? Do you generally have tight muscles and are you prone to sore muscles? Do you sleep poorly? All of these behaviors are symptoms of inadequate breathing technique. We are pretty casual about a body function that is essential to life itself.

First let us identify our breathing components. (I wonder if Shimano® could develop a SIBS, Shimano Integrated Breathing System, operated by pinky controls?) It will be easier to identify your breathing components while you lie on your back on the floor. Beginning at the top, run your hands along your collarbones (clavicle) from your shoulders to your breast bone (sternum). Now move down to your ribs and feel the solid structure of your rib cage and its remarkable flexibility as you take several deep breaths. Next, follow down the sternum and notice how large your rib cage is. Your lungs and heart fill this space. Notice that your rib cage increases in circumference toward the bottom, just as your lungs are larger at the bottom.

continued on page 78





During inhalation the external intercostal muscles lift the ribs, which pivot at the transverse process of each thoracic vertebra, increasing the volume of the chest. Notice how changing the angle of the rib increases the circumference of the chest.

Observe the direction of the external intercostal muscles that are external to the ribs and draw the ribs up during inhalation. The internal intercostal muscles are in between the ribs, inside the external intercostals. They tie perpendicular to the external intercostals and draw the ribs down during exhalation. In the front near the sternum they are not overlain by the external intercostal muscles. Not shown are the innermost intercostal muscles that have the same slant as the internal intercostals and are inside the ribcage.

Learn to use the muscles that affect breathing and release the others. During inhalation the muscles of the chest, back, and abdomen affect vertical lengthening. During exhalation the emphasis is on horizontal contraction. While you are sitting erect, observe this distinction. You can increase lung capacity by releasing tension in your neck, shoulders and chest and by countering gravity's downward pull with upward release. This will free your upper ribs to float upward.

References:

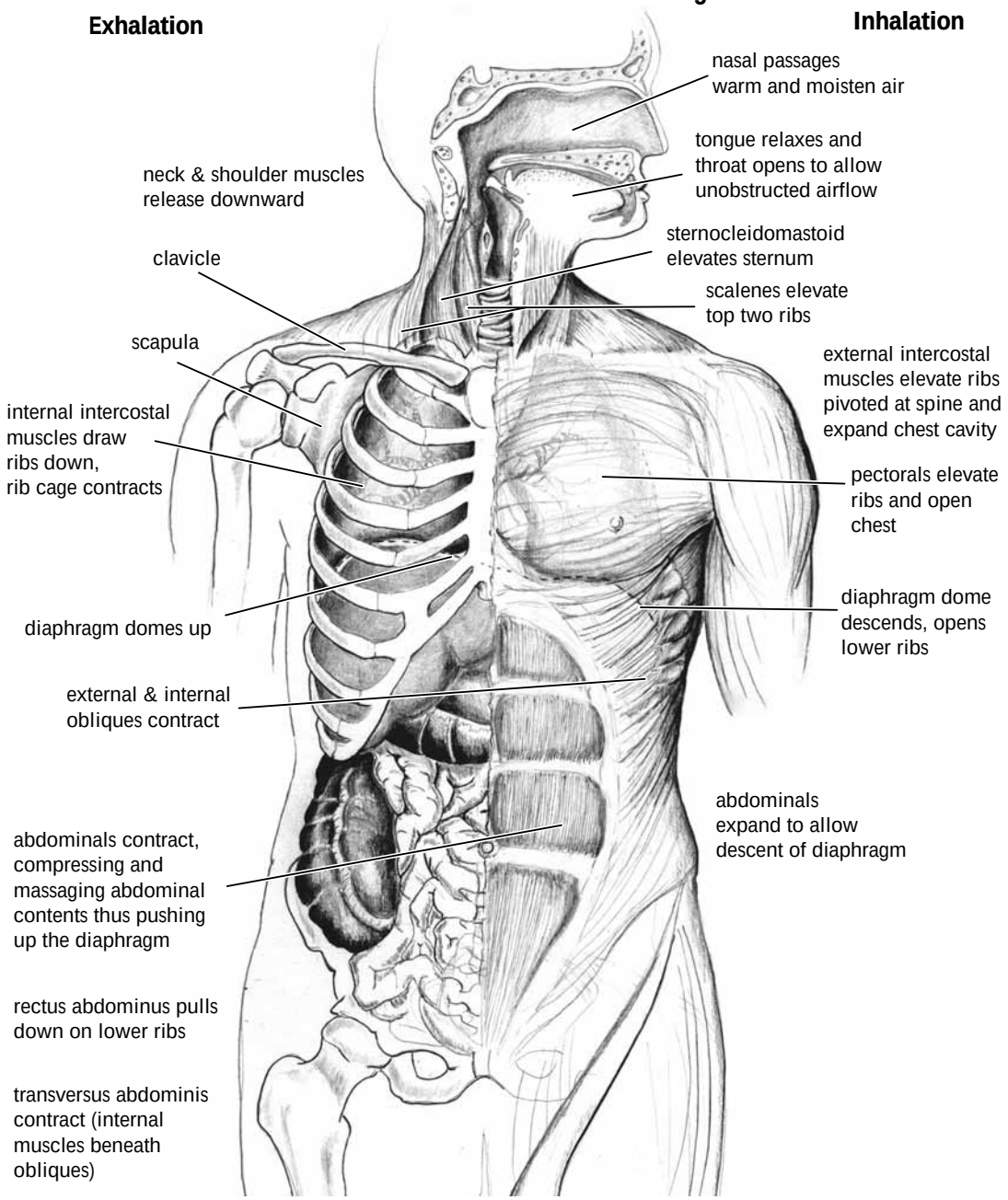
Coulter, H. David, pp. 74-82

Iyengar, B.K.S, pp. 17-31

Netter, M.D., Frank H., *Atlas of Human Anatomy*, Icon Learning Systems, NJ, 2003. ISBN 192900711-6, Plate 191

Poltin, Kevin T., and Gary A. Tribodeau, *Mosby's Handbook of Anatomy and Physiology*, Harcourt Health, 2000, p. 428. ISBN 0323-01096-2

The Mechanics of Active Breathing



Illustrations by Pat Conrad

Now you can locate your diaphragm, the primary motor of breathing. At the bottom of the sternum is a short cartilage extension (the xiphoid process) where the diaphragm attaches. You can distinguish the xiphoid process because it is more sensitive than your sternum. On your sides you can feel the two lower ribs that are not attached to your breastbone, therefore allowing for more expansion during diaphragmatic breathing. The diaphragm is attached to the six lower ribs and to the lumbar spine. (Iyengar, p. 30)

Perhaps you have not thought of your abdominal muscles as part of your respiratory system. They need to coordinate with and support the movement of your diaphragm. You can locate the muscles you need to use in natural breathing by placing one hand on your abdomen, one on the xiphoid process, and pretending to blow out a candle. Notice how your abdominal muscles draw in and then relax. Contrast this movement with tense abdominal muscles characteristic during anxiety or stress by lifting your head off the floor. Feel the tightness from your pubic bone into your chest. Now that you have distinguished the movement of your diaphragm and the contrasting behaviors of your abdominal muscles, you can understand the use of the abdominal muscles in natural breathing. When your diaphragm contracts downward with each inhalation, let your abdominal muscles relax and your abdomen protrude. With each exhalation, your diaphragm relaxes and returns to its dome shape, expelling the air from your lungs. You must expel the maximum amount of spent air from your lungs for maximum efficiency. When the diaphragm is relaxed, it has reached its maximum height. Only by contracting your abdominal muscles and pressing your abdominal organs up against your diaphragm can you push the diaphragm higher. This compresses the lower lungs and expels more air. Let your abdominal muscles contract and pull inward, supporting the diaphragm for a complete exhalation. The natural movement of your diaphragm depends on relaxed expansion and firm contraction of your abdominal muscles. When your diaphragm and abdomen muscles work together, there are several benefits:

1. You move more air in and out of the lower lobes of your lungs, resulting in more efficient oxygenation.
2. Your abdominal organs and heart are massaged by the movement of your diaphragm and your abdominal muscles. This movement increases circulation and improves function.
3. Your abdomen muscles are strengthened by constant use.
4. You will experience a calming effect.

With knowledge of the placement of your breathing components, observe how you use them. Place one hand on your waist, one on your chest, and breathe deeply. Does your chest rise and fall or is most of the movement at your waist? Natural breathing is driven by

the diaphragm and causes movement at your waist. If you feel most of the movement in your chest, you are a chest breather and will benefit greatly by retraining yourself to breathe naturally. Shift the movement of breathing to your diaphragm by pushing up at your waist against your hands.

Once you have distinguished the movement of your diaphragm, support its movement with your abdominal muscles. When your diaphragm contracts downward with each inhalation, let your abdominal muscles protrude. With each exhalation, let your abdominal muscles contract and pull inward, supporting the diaphragm for a complete exhalation.

At times you may find unusual difficulty in moving your diaphragm. This happens when your abdominal muscles and organs are tense. As your diaphragm contracts downward, it is restricted by your rigid abdominal organs. This condition is usually caused by psychological tension and the "flat-tummy, body-beautiful" syndrome but also may result from abdominal surgery, injury, or other trauma to the pelvis. You can relax these organs by doing stretches for the diaphragm and abdomen, getting a professional massage, or practicing Yoga, Qigong, and acupressure. Visualization is also a useful tool as you release tension and promote healing. Be creative and imagine your abdominal organs as calm, contented, appreciated, and relaxed.

When the diaphragm is restricted in movement by prolonged periods of stress, breathing shifts up into the chest. Not only is a smaller volume of air moved but limited oxygenation takes place in the upper lungs. The lower lobes are larger in volume and richer in capillaries. Gravity pulls on your body and increases the volume of blood flow to the lower lobes. This is why approximately 80 percent of your blood accessible for oxygen exchange is in the lower lobes. If you are a chest breather, you rarely access the 80 percent of the blood supply in the lower lobes. Most of your air movement is in the upper lobes, which do oxygenate the blood but remove carbon dioxide less efficiently than the capillary-rich lower lobes. Diaphragmatic breathing will dramatically increase the amount of air moved and reduce breaths per minute from 14 or 15 to 8 or 12. (Hendricks, p. 45)

The movement of your rib cage may also be restricted by tight muscles and poor posture. If your shoulders are stooped, and your head is carried forward, your rib cage is permanently compressed. Cyclists must be especially watchful to keep their chests open. Be sure your handlebars are close enough to your seat to enable you to ride with your elbows bent back toward your hips. Rather than rounding your shoulders, broaden your upper back and shoulders energetically without straining while keeping your chest open.

The specific muscles you use to breathe not only influence your oxygenation efficiency but connect intimately to your psychological state. Because our fight-or-flight nervous system is associated with chest breathing, shallow breathing in the upper lungs and chest originates from and results in stress and anxiety. Next time you give a presentation or demonstrate a skill, notice if your breathing has moved up high into your chest. Is this

condition fun? No! Generally, life is more fun without anxiety, and now you have a tool to change your attitude and improve your performance! Consciously move your breathing down to your diaphragm, and engage your parasympathetic or calming, nervous system. Just as Andrew Weil stated, now we can influence some of our autonomic systems through the breathing "bridge." Later we will explore John Douillard's work, which demonstrates how controlled breathing influences pulse rate during athletic performance.

There are three different breathing styles that we are discussing: diaphragmatic, conscious, and three-part breathing. *Diaphragmatic breathing* is natural and uses the respiratory system the way it was designed to function. The diaphragm, abdominal, and intercostal muscles are used to move air in and out of the lungs in contrast to chest breathing, which is more restrictive and high in the lungs. *Conscious breathing* can also be called controlled breathing. It includes any breathing style or technique that we consciously control. During retraining from chest breathing to diaphragmatic breathing, you will need to be conscious of your breathing. There are a great many types of psychospiritual, therapeutic breathing techniques that are conscious. *Three-part breathing* is one of these techniques that will help you identify and control the action of all your lung capacity.

Using Three-part Breathing to Develop Your Conscious Breathing Skills

Three-part breathing uses the muscles of the abdomen, diaphragm, chest, and clavicle to expand and contract the lungs. Three-part breathing will help you develop the full volume of your lungs. With one slow and conscious breath, begin to expand your lungs with your diaphragm while releasing your abdominal muscles. Move upward into the chest and finally lift your collarbones. It may help you expand your lungs up under your clavicle by knowing that you will contract muscles in your neck to lift your sternum and clavicle (sternocleidomastoids) and to lift your top two ribs (scalenes). The expansion of your rib cage can also be facilitated by visualizing broadening across your upper (thoracic) back. Reverse this process by deflation, starting at the collarbones and letting your lungs empty all the way down to your diaphragm. Finally, contract your abdominal muscles. It takes a bit of coordination, doesn't it? Practice it for a while until the results are fairly predictable. You will get some indication of how effectively you have been using your lungs by observing how much you are expanding your chest. If you have to concentrate to systematically fill the lungs from one end to the other and then empty them in reverse, you will need more practice to derive maximum benefit from controlled breathing.

If you have respiratory problems, this exercise can be particularly challenging and all the more valuable for you to practice. Respiratory problems are aggravated by poor posture, misshapen chest, obesity, emotional disorders, lung troubles, smoking, and uneven use of your respiratory muscles. (Iyengar, p. 31) Notice that many cyclists have poor posture from extended hours of riding. This poor posture can result in rounded shoulders, collapsed

chest, and compressed diaphragm. Failure to correct these problems causes many subtle changes in your body and mind as well as gross ones like fatigue, bad attitude, poor stamina, and heart disease.

During conscious breathing practice, the length and depth of each breath should be relaxed and effortless. Give conscious attention to the manner and sequence in which muscles are used. Practice gently and slowly. You will know you are trying too hard if you experience dizziness, tension, or discomfort. If these occur, pause and rest before resuming practice. If you have health problems where difficult breathing is a secondary symptom, use Gay Hendrick's program *Conscious Breathing* and consult with your physician.

With these cautionary comments in mind, try the *breath of joy* to use all parts of your lungs and observe the dramatic effect conscious breathing can have on your energy level and mood. Stand with your feet at shoulder width. Raise outstretched arms in front of you to shoulder level and partially inflate your lungs with your diaphragm. From this position, sweep your arms in an upward arc that ends at your sides at shoulder level and inflate your lungs further with your chest. Finally, arch your arms up over your head and complete the inflation of your lungs into the clavicular region. Now release all this air with an audible, complete exhalation as you drop your arms down past your hips, ending the movement near the floor as you drop down into a crouch, completely releasing your shoulders and arms. Repeat this several times taking care not to hyperventilate. Use this technique when you are feeling tired, tense, or melancholy. You too, will find joy.

Establishing a Rhythm

When you can depend on the coordination of your respiratory muscles, begin work on a consistent rhythm, which we will call SELF breathing: Slow, Even, Long, and Full. Your current breathing style may be to exhale, hold, inhale, and hold. Now try keeping your diaphragm moving all the time. Slowly, inhale and without a pause slowly exhale. Strive to match the inhalation and exhalation in duration and quality. It may help to visualize each inhalation-exhalation cycle as a loop in a spiral rather than an out and back pattern.

As you gain confidence, lie down and practice SELF breathing while stretching or holding Yoga postures. If you are a Taiji practitioner, let your SELF breathing flow easily with your form. When you use SELF breathing while bike riding, you will probably need to slow your pace to an exertion level that allows you to breathe rhythmically without panting.

When you lapse back into panting during exertion, try this experiment: pant a few breaths and observe how effectively your respiration returns to normal. Then engage your new skills and return to SELF breathing, exhaling completely. If your new skills are sufficiently developed, you will observe a quick and dramatic return to normal breathing. This surely demonstrates the greater efficiency of trained breathing.

Exhaling is the Work Phase of Breathing

Have you ever noticed when you pant your inhalation is stronger than your exhalation? While a powerful inhalation is automatic, you need to train yourself to balance each inhalation with a strong and complete exhalation. The function of the inhalation is to bring fresh, oxygen-rich air into the lungs to oxygenate blood to feed every cell. The function of the exhalation is to push out the spent, oxygen-depleted air to make space for fresh air. Have you ever felt as though you were going to burst while gasping for breath during extreme exertion? That means your exhalation needs work. While you are sitting, try expelling all the air from your lungs by a firm contraction of the diaphragm, abdominal muscles, and intercostal muscles of your chest. You can feel really empty. Whenever you find yourself gasping, focus on complete exhalations that go beyond your untrained habits and expel the last spent air from your lungs. Then inhale through your nose.

An effective technique for developing your exhalation is 1:2 breathing where you consciously exhale for twice as many counts as you inhale. Follow these steps to get started:

1. Begin conscious breathing using SELF breathing.
2. Establish a count for each inhalation. You can probably count to three or six on each inhalation but don't strain, just breathe in a sustainable pattern.
3. Now multiply the inhalation count by two. If you had three counts while inhaling, you will exhale to the count of six.
4. Ensure that your counting beats are uniform. Count one, two, three as you inhale and four, five, six, seven, eight, nine as you exhale. This will cause you to use conscious effort at the end of the exhalation.

If you practice while sitting and expanding your chest fully, you might count three on the inhalation and six on the exhalation. When you're riding or walking, a 2:4 count is more likely to be sustainable. Individual lung capacities vary as well as personal breathing patterns, so find the count that you can maintain for prolonged periods. As you become proficient at this technique, your stamina will increase. Take care to inhale only as long as the count and not until your lungs are ready to burst. Counter-intuitively, the diminished emphasis on inhaling actually increases your capacity to bring in fresh, oxygen-rich air. That is because the complete exhalation has removed more of the spent air and made space for fresh air to rush in more efficiently. When you first begin breathing practice while riding, you may find 1:2 breathing easier than SELF breathing. Use the same diaphragmatic technique emphasizing the exhalation with the 1:2 rhythm in contrast to the evenly balanced inhalation and exhalation of the SELF breathing. You will find that focusing on your breathing while riding will bring you into the present moment and clear your mind of chatter.

John Douillard is a pioneer and leader who trains athletes in breathing technique. He uses Ayurvedic techniques to improve athletic performance. Remarkably, he has discovered that controlled, diaphragmatic breathing allows pulse and breath rates to remain low during high exertion! As with SELF breathing, Ayurvedic breathing opens up the lower lobes of your lungs. Douillard's studies confirm that it is worth the effort to learn to use your full lung capacity because the performance of all your body systems depends on delivery of oxygen and removal of carbon dioxide.

Ayurvedic breathing uses the nose instead of the mouth, with several benefits. Breathing through the nose will condition the air to body temperature and moisture *before* it reaches the lungs. The nose, designed as the breathing instrument, has turbines and turbinates (spiral, spongy bones in the nasal passages) to drive air into the lower lobes of your lungs. To practice nasal, controlled breathing, make a raspy sound at the back of your throat with the muscles and vocal chords used in clearing your throat. This closes off airflow through the mouth and opens the throat connection to the nasal passages. Another technique for opening the nasal and throat passages is to create a yawning sensation in the back of the mouth. If you must breathe through your mouth, place your tongue behind your upper, front teeth to slow the passage of air though your mouth and condition the air to some degree. Mouth breathing is often necessary at cooler temperatures due to nasal congestion. You can also protect yourself from breathing cold air by covering your mouth with a neck gaiter or face mask made of two layers of polyester fleece. This provides an external temperature gradient and protects your lungs from the harsh effects of cold, dry air.

For further discussion of diaphragmatic breathing for high levels of athletic performance, read John Douillard's *Body, Mind and Sport* or listen to his audio tapes *Invincible Athletics*. Ayurvedic breathing benefits extend beyond increased efficiency and lower heart and breath rates. They also produce a tranquil, rejuvenating state, making physical workouts renewing rather than exhausting.

Points to Remember While Practicing Breathing

1. Breathe with your diaphragm.
2. Release your abdominal muscles and let them move out with each inhalation. A flat tummy may look good in a swimsuit but it precludes healthy breathing technique.
3. Empty your lungs completely, expelling all the old air so new oxygen-rich air can flood into your lungs. Exhalation is the active phase of breathing. Draw your diaphragm up and compress your abdominal and chest muscles to complete each exhalation.
4. Use all three regions of your lungs: the lower lobes at the diaphragm, the chest, and high at the clavicle. Relax, expand, contract.

5. Relax and open the back of your nose and throat by simulating yawning and allow air to flow unobstructed.
6. Be patient and allow years to retrain your breathing. Stress will make your breathing rise up in the chest. You will consciously need to shift your breathing back down to your diaphragm.

Overcoming Challenges You May Encounter While Practicing Your Breathing Technique

I hope you clearly understand the concepts and benefits of controlled diaphragmatic breathing. You will need to make retraining a priority and to incorporate it into your daily living as well as your athletic activities. Brief practice in using your diaphragm and abdominal muscles will not translate automatically into increased stamina in cycling. Let's look in more detail at some of the challenges and benefits you might experience along the way.

Some people discover a fear of asphyxiation when first trying to control their breath. Simply acknowledging the fear and practicing in comfortable and secure surroundings will probably overcome this anxiety. Seek out Yoga classes where breathing is taught with each posture. When you are first working to coordinate new breathing skills, it is encouraging to work in a class of like-minded people and to receive effective coaching from a knowledgeable teacher. If you are accustomed to controlling your breathing while swimming, you may find breath training quite natural.

Anxieties and other emotions may well up while you are practicing breathing. Rather than ignoring them, participate in those feelings and breathe into them and the part of your body where you sense them. Breathing through them may enable you to handle them and eventually release them. Consciously breathing into and relaxing both physical and psychological pain will diminish it and facilitate healing. I recommend Gay Hendricks' *Conscious Breathing: Breathwork for Health, Stress Release, and Personal Mastery* as an excellent resource for using breathing for general health and healing.

During intense exertion or stress, you may hold your breath and tighten your abdominal muscles. Use conscious breathing to overcome these counterproductive practices and be especially alert when you are doing aerobics, isometrics, and Yoga postures. Holding your breath increases tension and reduces your ability to improve muscle tone. If you find yourself holding your breath, back off the activity and focus on your breathing.

Restrictive clothing around your waist will interfere with your progress in breathing technique. Avoid confining clothing that interferes with the full use of your diaphragm and abdominal muscles. Instead, you might try suspenders, loose-fitting waistbands, or bib shorts and tights. Riding with a forward lean of more than 45 degrees compresses your diaphragm and interferes with breathing performance unless you are able to maintain your lumbar curve. Most people find this uncomfortable since it presses the pubic bone into the saddle.

Breath training while cycling requires full concentration. I recommend you ride alone while you are coordinating your breathing skills. Trying to superimpose breath training on group rides may discourage you from slowing your pace to optimize your breathing performance.

The great swimming and cross-country skiing coach, Sven Wiik, often challenged his athletes to focus on their technique. He would ask his swimmers to concentrate exclusively on their form for just one lap of the pool. He reported that their success rate was poor, and their minds usually wandered off to other matters to the detriment of their swimming skills. How often have you gone out for a ride to relax and renew and found your mind churning? Conscious breathing can keep you in the moment so you can be alert and engaged in your surroundings, your physical sensations, and your companionship of friends while cycling. It can also *improve your technique*.

Relaxation, Renewal, and Recovery Depend on Diaphragmatic Breathing

Conscious breathing heightens your awareness and physiologically transforms your mind and body functions. Diaphragmatic breathing enables you to relax, rejuvenate, and pace yourself so you can recover quickly.

Relaxation is a fine art and must be well developed before you can relax at will. This does not mean being limp but effortless and light using only those muscles that support your action and releasing all others. It is the key to efficiency. Keep in mind that you need to learn how to relax at will in a quiet place before you can incorporate the practice into your bike riding and other demanding situations. Hendricks assures us that it is not possible to remain anxious while breathing diaphragmatically (Hendricks, p. 160) so practice conscious breathing regularly. You can practice discretely anytime or anyplace. Remember to coordinate your breathing with your stretching and strengthening exercises.

Each ride can be rejuvenating when you use diaphragmatic breathing. Begin slowly and gradually build up your energy level to prepare your mind and body for increased exertion. Shift into diaphragmatic breathing immediately and use it to pace yourself. Any time you begin panting or breathing too hard to maintain control of your breathing rate, slow down and reduce your exertion level to a sustainable breathing level. Eventually your breathing skills will enable you to ride at high exertion while maintaining a lower breathing and pulse rate. The surprising result is improved endurance while completing your ride feeling refreshed and renewed.

Avoid becoming obsessed by challenges encountered during a ride and with distance goals that distract you from accurately accessing your stamina level. This could be a compulsion to ride all of a steep, technical climb without walking or to complete a pre-determined mileage even though you are exhausted. I have learned to stop every hour, get off my saddle, and stand astride my bike. From this perspective, I can accurately evaluate

my comfort and stamina levels. I check my shoulders and neck for tension, my perineum for numbness or chafing, and my fuel level to see if I need to eat something. After a thoughtful assessment, I often need to adjustment my clothing, my pace, or my route plan.

I discovered this technique when riding at night in blizzards. Several times I rode to evening meetings or home from work during challenging conditions, pushed myself too hard, and arrived at my destination drenched in sweat and feeling weary and scattered. I resolved to avoid this foolishness in the future and sort out the causes of this behavior. I realized that I had not honestly accessed my psychological comfort about riding in blizzards. Since I needed to travel and traveled by bike, I just launched myself into the storm. This made me feel at risk so I shifted into overdrive and rode compulsively. I realized that psychological comfort is as important as physical comfort. How could I enjoy riding in these circumstances and still deal with poor visibility and sketchy traction? First, I would take time to enjoy the beauty of the blowing snow and white landscape. Then I would stop every half hour and tune in to my comfort level. I was delighted to discover these techniques enabled me to pace myself, have fun, and arrive home refreshed. I was satisfied that my bike was reliable transportation and I had once again found contentment in nature.

Just as I discovered, you too can use conscious breathing to appreciate your immediate circumstances and to gauge a sustainable energy level and an adequate fuel level. Riding harder than you can adequately fuel yourself with oxygen and calories results in the production of byproducts in your system that prolong recovery time. Use your breathing to pace yourself, maintain good judgment, and ensure quick recovery.

Establishing a Moderate-intensity Aerobic Exercise Routine

I've heard it said that U.S. citizens are quick to take action but short on planning. The behaviors of many recreational cyclists confirm this adage. They are eager to get out and ride but unlikely to develop a plan for consistent fitness or to plan adequately for their ride needs. The first task is to develop a ride schedule. The second task is to equip yourself properly so each ride will be fun and safe. Thirdly, care for the mechanical needs of your bike as an extension of caring for yourself.

Regular, moderate-intensity exercise makes it easier to develop and maintain your fitness base and to increase your riding confidence. I recommend a minimum of 30 minutes of daily exercise. Forego the 50 milers on the weekends until you have built a fitness base adequate for longer distances. It is truly remarkable how, over time, short daily rides can build substantial muscular and aerobic fitness. This exercise pattern makes riding more fun because you will feel energized and refreshed at the end of each session and eager to get back on your bike the next day. It also facilitates learning new techniques because you increase your familiarity with your bike and are alert and focused throughout each ride. Brisk exercise at least five days each week is the regimen that most effectively reduces risks

of serious illness. Daily moderate exercise takes more months to develop high-performance fitness and does not produce an adrenaline rush but it will help you develop the healthy attitude of a self-nurturing person. Now that is something to feel good about.

A daily exercise routine of moderate intensity produces healthful and lasting results. You can be sure you are building fitness when you experience the following benefits:

1. Increased energy
2. Lower heart rate
3. Improved quality of sleep
4. Balanced appetite, that is, the absence of cravings and immoderate eating
5. A desire to continue exercise for the pleasure of it
6. A general sense of well-being
7. Increased focus and contentment
8. Improved biomechanical form and increased appreciation for your fit body

With such a desirable list of benefits, why do so many fitness buffs seek out extreme exercise? Perhaps it is impatience to achieve fitness results quickly that causes riders to overdo on weekends in an attempt to compensate for inactivity during the week. But let's look at the pitfalls of over-training through high-intensity, prolonged exercise.

1. Whenever you ride hard enough to experience soreness the next day, you create microscopic tears in your muscle fiber membranes and protein filaments. (Burke, p. 38) Rather than building up your body, you are actually tearing it down.
2. This damage causes increased blood flow and swelling within the muscles requiring a return to light exercise and potentially leads to lost training time for recovery.
3. The burning sensation in your muscles indicates lactic acid build-up and intensifies soreness and fatigue.
4. Riding while fatigued causes your riding form to deteriorate, making retraining difficult and discouraging.
5. Over-using your muscles and regressing to poor form increase your risk of injury either on the bike or in the days following.
6. Collectively, over-training and its physiological and psychological changes result in a general deterioration in athletic performance.
7. Central fatigue impairs your judgment and increases the likelihood of mishaps.

I hope this reality check encourages you to begin a daily, moderate-intensity exercise routine.

The term moderate-intensity exercise is so commonly used that it requires special definition for *Bicycling Bliss*. For our purposes, moderate-intensity exercise means the

maximum pace you can sustain for three hours. To establish what pace this is for you, you will need to frequently access your heart rate, breathing, muscle fatigue, mental focus, and psychological comfort. If you are pushing too hard in one of these aspects, reduce your output until you get to a sustainable exertion level. *Bicycling Bliss* emphasizes moderation and awareness. Riders who are beginning a fitness program or who have endured an exhausting work schedule in recent days will ride more slowly than cyclists who have already built a strong fitness base or who are well rested. Consequently, a moderate-intensity pace will vary widely under different circumstances for any one individual. Within any group, moderate-intensity exertion for some riders would be low-intensity for others. It is essential to make your exercise routine enjoyable and know that you are truly building fitness. If it takes five years to build the fitness base that has tangible health benefits for you, that is just fine because you are active and enjoying it. Only then will your program be *sustainable* and keep you fit and fun-loving past mid-life.

Notice the difference between this definition and the definition of moderate-intensity used by athletic trainers. These pulse-rate based systems require that you establish your personal maximum aerobic output and then work at a percentage of your maximum, based on age and condition. They tend to be inflexible and do not adapt as well to your immediate needs. They may distract you from tuning in to your condition. Pace is critical to your short-term and long-term goals, to your exercise routine, and to your daily work routine. It requires constant awareness of your breathing and of the details of the exercise process. When you do this, you will know when you are breathing harder, perspiring, and maintaining a steady, moderate-aerobic workout.

Pacing and a moderate exercise program translate into increased balance and moderation in your life. Since rest and recovery are essential to building muscle strength, a daily exercise program naturally incorporates the pattern of exercise and recovery necessary to incorporate it into a busy schedule. For example, exercising five days each week allows for two days off to accommodate variations in your business and family schedules.

Develop your program gradually with sensitivity to your individual physical and mental conditions. Any changes in distance or pace should be made wisely and gently with a watchful eye on the quality of your exercise session. Keeping an exercise journal will help you monitor your progress and help you discover patterns in your wellness. Bear in mind that all the tools discussed in this chapter and the resources discussed in Chapter 7 are part of your wellness program. Avoid neglecting sleep or proper nutrition to pack your exercise into an over-scheduled day. The goal is to increase well-being, not to sacrifice your health to build “body beautiful.”

Here are some suggestions for establishing a daily exercise program that you can maintain.

Scheduling, Location, and Distance:

- Select a route around your neighborhood to make your daily riding routine manageable.
- Take time to leisurely and creatively evaluate local streets and trails for suitability.
- Change this route occasionally for variety and as your abilities change.
- Now design an alternative plan for poor weather so it will be easy to change plans and not use it as an excuse to skip exercise. This could be a different ride route, stretching, swimming, or creative dance. Make it something fun you can do for at least 30 minutes of conscious breathing.
- Target a realistic number of days each week, say four or five. Then identify the time of day that is most appealing to you. That could be morning or evening but some people find time and a good route at work and ride during lunch break. If you ride immediately upon waking, no grooming or bathing is necessary before you ride. If you ride last thing in the evening you can make your cleanup your nightly bathing routine.
- Now make a *realistic* weekly and monthly schedule.
- Start with an appropriate distance for your current fitness level. Be sure to warm up gradually and cool down purposefully. If 30 minutes of riding seems inadequate for your current fitness level, make those 30 minutes more demanding. You might ride a mountain bike, reduce your tire pressure, or carry a load to increase your exertion level. You'll develop your own tricks.
- Bicycle commuting is an ideal way to get your daily ride into the schedule with very little additional time required. Refer to "Cyclists Help Build Healthy Communities" in Chapter 2, pp. 45-46.
- Avoid jamming your exercise into an already packed schedule. More self-imposed pressure will not contribute to your wellness. Review your current schedule and select something to eliminate so your exercise can take that time slot.
- As you establish your routine, your energy and focus will increase, making you more effective and efficient during each day so you may even make time for reflection.

Maintaining a Moderate-intensity Exertion Level:

- Use conscious breathing, both in the planning phase and during exercise.
- Avoid using stimulants. By their very nature, they push you out of balance and encourage obsessive behavior.

- Seek out compatible companions to share your exercise routines.
- Break away from the riding styles projected by the media; many of them are excessive.
- Allow time to develop the fitness level you desire. Avoid committing to events or vacation touring rides that are well beyond your current stamina level.
- Respond to your physical and psychological needs and customize your exercise to your condition. When your legs are leaden, take a short spinning ride to loosen up or declare a rest day. Over-training is the most common cause of injury and burnout.

If you doubt that you can build and maintain the fitness you desire with these constraints, refer to John Douillard's *Body, Mind and Sport*. His research has been with competitive athletes, and he explains in detail how conscious, diaphragmatic breathing makes it possible to build fitness while simultaneously allowing you to experience relaxation, rejuvenation, and quick recovery.

Getting Started:

- Start during warm weather with longer daylight hours. As your fitness and confidence increase, you will experience the benefits of regular exercise. As the days become shorter and cooler, you can gradually adapt to more challenging conditions. With proper planning and equipment, you will be able to maintain your routine most of the year. Refer to Chapter 8, pp. 327-357, to enable you to make informed clothing choices and Chapter 9, pp. 368-370, on selecting appropriate illumination.
- The first weeks of your new routine will be more difficult than after your routine is established. The more often you do any task, the easier it becomes. Not only do you do a better quality job but you do it with less effort.
- Phil and Jim Wharton (*Active, Isolated Stretching*) advise that once you have committed to a fitness program, do not renegotiate your commitment each day. Just go out and do it without questioning your commitment.

Variety is the Key to Maintaining Your Enthusiasm and Motivation:

- Change your routine on whim or for the weather. Identify several ride routes and select the one that interests you today. You may enjoy the social aspects of going to a gym to exercise. But if time is at a premium, create something fun to do at home.
- Fun is important to your success. If you are watching the clock (or odometer) you are not having fun. Be creative and playful so you are not conscious of the passing of time.

- Establish some form of support system so you have someone with whom to share your experiences. If a friend or family member is not available, keep a training journal and use it for reinforcement.
- Toss aside some of your cherished laborsaving devices. Bypass the elevator and take the stairs. Park a few blocks away from work or the store and walk a few minutes. Retire the power mower and human power a reel-type mower. Maintain a brisk pace at each of these tasks and you will feel results.

Riders Who Have Used Cycling to Dramatically Improve Their Fitness Have These Tips to Share:

- Ride every day.
- Make every ride a pleasure ride so you will look forward to your fitness routine.
- Establish some parameters that allow you to observe your progress.
- Find a companion of similar abilities to help you keep your commitment and add to the fun.
- Set realistic goals so you will be encouraged by success.
- Establish a routine but provide some variety for interest.
- Make this a time of sharing with someone you want to spend more time with.
- Be willing to invest in needed equipment. This is an investment in your wellness.
- Be sure to eat and drink adequately so your exertion level is comfortable. If you ride before breakfast in the morning, use an energy beverage or snack to avoid running on empty.
- Ride during the workday and carry a cell phone to stay in contact with business associates.
- "Break loose from the excuse circuit. Whatever niggling thing is keeping you from riding, get rid of it. Lost gloves? Buy another pair. It's raining? Go get a raincoat. Just contrast these expenses with the cost of filling up with gas for a month," says Rex Brian, who shed more than 30 pounds following his own advice while running his own consulting business and parenting four teenagers with his physician wife.

Most people who maintain daily exercise routines find that they have more energy, are better able to handle the challenges of life, and sleep more soundly. Over a year's time, 30 minutes of activity a day adds up to a lot of calories burned, so you can surely take more

pleasure in food. Active people also have higher metabolic rates — a perk that increases their nutritional choices.

Beginning a regular exercise program gradually does not exclude moderate-intensity endurance rides of four hours or more. After your commitment to cycling is well established, you may want to explore the benefits of longer rides. They can transform your performance and your sensitivity to your needs. It takes about eight to ten weeks of endurance training to build a good endurance base. Endurance rides result in the following beneficial physiological changes:

- An increase in the number of capillaries surrounding muscle cells
- An increase in the number of red blood cells
- An increase in enzymes that speed the chemical reactions in your body
- An increase in the transport of oxygen to your cells

All of these things mean your performance and endurance are optimized, and your body responds more quickly to fuel and exertion requirements. You will also become more aware of your exact fuel and rest needs. Endurance training should also be designed with the same attention to your general well-being and avoidance of excesses as a beginning exercise program.

Alexander Technique

In searching for a better understanding of kinesthesia on the Internet, I "discovered" the Alexander Technique. What a classic example of not "finding" something until you are ready for it. After becoming an appreciative student of Alexander Technique, I found an article about it in a newsletter at home. However, I had passed it by because it was not meaningful to me at that time. First I read Robert Rickover's *Fitness without Stress*. The title intrigued me since it seemed to be an excellent fit for *Bicycling Bliss*. Indeed, it provided an outstanding introduction to Alexander Technique.

The technique was developed by F. M. Alexander (1869-1955). He was a successful Australian dramatist during the late 1880s. His career suffered when his voice began failing him in the middle of a performance. Doctors were unable to help him overcome this problem so he decided to study his voice weakness and cure himself. It took him 10 years but he solved his problem! His transformation was so dramatic that some of his colleagues asked him to instruct them in his technique. Gradually his success as a teacher led him to England and eventually to the United States. Alexander discovered and demonstrated the unique role of the body in the development of conscious learning. His technique is a tool for heightening self-knowledge and changing old habits.

Alexander identified tension and compression in his neck as the cause of his voice failure. Most of us can share his concern about neck tension. However, *he* was able to

develop techniques for retraining himself that were effective and led to a wider understanding of how we use and misuse our bodies.

Alexander Technique is based on the idea that from a young age, we unconsciously develop habitual movement patterns. Some of these habits help us work efficiently but others are limiting and even harmful. We don't notice the harmful habits until they cause us pain or injury. Then we usually blame the pain on stress, the work environment, poorly designed furniture, or a poor bicycle setup. We rarely search our own habits for the cause and take responsibility for our own predicament. How many times have you heard, "I wasn't doing anything and suddenly my back went out." Well, it was not so "suddenly." Rather, it was the result of years of harmful movement patterns that are so ingrained in our habits that we don't recognize them until they finally create pain or discomfort.

I was excited to find confirmation of my premise that discomforts while cycling are caused by movement habits we develop through life's routines. They show up while cycling because the motions we use in cycling are repetitive and because many riders push themselves past their comfortable stamina levels.

Just as Alexander did, we can choose to retrain ourselves in healthful, properly aligned movement patterns when we commit adequate time and dedication and seek out proper instruction. The desired result is graceful, poised, effortless movement and a well-aligned spine.

Successful retraining depends on the following key elements:

1. Heightening your sensory awareness of the difference between beneficial and damaging uses of your body
2. Consciously controlling otherwise automatic and faulty response patterns to any given stimulus
3. Aligning the head, neck, and back to improve the quality of body use
4. Learning that letting go of harmful habits is more important than acquiring the "right knowledge"
5. Focusing on observation, the process of change, and abandonment of the egocentric concern with results

Working through Alexander Technique analysis and retraining empowers students to learn how to change old habits. It gives them a sense of control over their own lives. They discover that the quality of their lives is improved by using their bodies to optimize healthful alignment. They are able to take responsibility for their own well-being and give up the victim mentality that "Life/stress just makes me this way." They feel "connected." Indeed, many movement patterns reflect mental attitudes. Alexander students often find that physical retraining can also be freeing intellectually and spiritually. It can even lead to

increased awareness of reality.

There are several noteworthy applications of these principles and benefits to athletes.

1. Currently, the characteristics that we associate with "the fit body" are based on habitual tension, which results in inflexibility. It is more important to use the appropriate effort to perform a task and to relax tension that is not useful. This is the definition of efficiency in athletic performance.
2. Preoccupation with winning usually means that other important aspects of life and health are sacrificed. Athletes are frequently encouraged to continue training at high performance levels even when it is destructive to their bodies and general well-being.
3. Athletes will benefit from avoiding the common preoccupation with the *quantity of exertion* and instead emphasize the *quality of movement*: balance, coordination, and the ease of breathing.
4. Many exercise programs do little to improve the way we use our bodies. In fact, they often exaggerate our worst habits. Watch a group of joggers or cyclists and observe how awkwardly some of them move.
5. Lack of body awareness is a major contributor to exercise-related injuries.

Books on Alexander Technique are by nature somewhat nebulous. Human movement and posture patterns are too complex to be understood in a short time. We need to give attention to the integrity of the entire body. Instruction by a certified teacher is essential in diagnosing the needed changes and in guiding retraining. During bike fittings I observe that *telling* people how to change is not adequate. It is more effective to gently guide their bodies and physical responses while they listen to verbal instructions.

To gain first hand experience with the technique, I took classes from a local, certified instructor. I learned that there are two basic approaches instructors use to support changing movement patterns: energetic and practical. The energetic style guides the student's body energy, intention, and visualization and is true to F. M. Alexander's teachings. The practical style is more familiar and uses muscular exercises to correct old patterns. It can be helpful during the retraining process. Whenever I observed myself moving in the old patterns, I redirected my energy, using different muscles and quality of movement, until this became the new instinctive pattern.

The energetic style required that I change my thought process and vocabulary to eliminate the usual concepts of "striving" and "trying." Integrated and balanced body use manifests as effortless movement. That means that retraining focuses on letting go of the old ways and manifesting the new movement patterns by intention, visualization, and energy direction. The energetic approach requires us to make basic changes. Using our

muscles is only one element of movement. Guiding the student with the hands while giving verbal instruction facilitates learning new movement patterns. This two-pronged teaching method allows our "body's intelligence" to respond to the physical guidance and helps us mentally conceptualize the intended movement. I found I needed to identify the energy location and direction to implement the new movement pattern. I needed to create new visions of movement focusing on lengthening and broadening my muscles to enable my body to work as an integrated whole.

Rather than further damaging the body by imposing a new muscular pattern on top of an old one, it is better to adopt the new movement patterns immediately. This is in contrast to the common practice of over-compensating for an inadequacy or harmful habit hoping to achieve balanced use sometime in the future. For years I tried to balance the strength of my legs by working my weaker left leg harder in hopes that it would someday equal the strength of my dominant right leg. I did not see that this created two imbalances instead of one. What a revelation to discover that I could reduce the power output of my right leg, visualize energetic balance while pedaling, and achieve balance immediately! Yes, this meant riding at a slightly lower energy level for a brief time but it enabled me to enjoy the pleasure and health benefits of balanced, integrated body use immediately! By putting my energy and focus into balance, I could achieve the desired effect without causing strain or damage to my hips or back. I have extended this retraining beyond cycling. Whenever I observe myself lazily using the superior strength of my right leg to get up off the ground or take a large step up to a higher lever, I consciously lead with my left leg as often as my right.

Alexander Technique places great importance on how we carry our heads. My retraining process has made me a believer in the interrelationship between head carriage and alignment of the entire length of the spine. Like many who spend a lot of time at desks and on bikes, I had carried my head so far forward that it created undue tension throughout my spine. Years of Taiji practice have diminished the degree of forward carriage but not eliminated it. My Alexander Technique instructor identified that I carried my hips too far forward. My pelvic rotation was fine but I needed to shift my hips back and my chest forward (actually raise my awareness of the front of my thoracic spine). To my amazement and delight, when I made this adjustment in spine alignment, *my head floated effortlessly on top of my neck*. It seems magical to me that a small correction in carriage of my hips opened my chest and effortlessly realigned my head position. Although I could feel the benefits of this adjustment immediately, retraining my body took more time. After a month of shifting my alignment many times a day, I miraculously *felt* the energetic change one morning during Taiji practice. To make this realignment lasting, the release of the hips and firming of the abdominal muscles was a small part. The primary dynamic was visualizing a lifting and elongation of the entire spine. It was a shift of my energy rather than a well-defined muscular action.

I was fascinated that the vital change needed to be effected right at my diaphragm. Could it be that this spinal misalignment is related to years of dysfunctional breathing or even weak abdominal muscles? I am delighted that the effective use of my diaphragm accompanied by relaxation of the adjacent organs facilitated the energetic and perceptual transformation of my spinal alignment. Through Yoga and Rolfing I have become aware of the front of my thoracic spine and I have opened my chest. My perception of my body has become three-dimensional. The better I understand the human body, the more I appreciate its miraculous design. With this one change in alignment, my entire body feels light and free. All movements are effortless, energizing me to meet daily challenges with enthusiasm! Such subtle fine-tuning of body alignment certainly requires analysis and instruction by a certified Alexander Technique instructor. You will find a list of instructors in your area at http://www.alexandertech.com/teachers.

Surely this new buoyancy I have found is convincing evidence that Alexander's initial premise is true: habitual movement patterns cause destructive tension and compression in the spine. Conversations with many customers convince me that this was not just a problem for Alexander's contemporaries but also an increasingly common problem among cyclists today. In fact, it appears that neck problems occur among all ages, social groups, and professions. Time to lighten up!

Understanding Yoga Postures and Stretching

Daily routines usually involve a limited range of movement. Regular stretching will improve your range of motion, body alignment, circulation, breathing, and centering.

Because cycling is a highly repetitive activity with a limited range of movement, the muscles that stabilize your body and power the bike forward can suffer from tightness and overuse. Since muscles work by contracting, they become shorter with constant use. If you do not stretch, they remain tight and create imbalances in your body alignment. Listen to any group of riders and you will soon learn where tension develops in a cyclist's body. Remember Timothy McTight? Refer to p. 13. Stretching or Yoga postures are essential for elongating shortened muscles.

Yoga postures guide you into new movements and help free you of habitual movement patterns. Mindful stretching will help you discover the idiosyncrasies of your body and help you select and practice the exercises where your movements are most limited.

Yoga improves circulation in several ways. Improved breathing increases the flow of oxygen to all parts of the body. Twisting postures compress body parts, squeezing or pressing the old blood and lymph fluids out of those tissues just like wringing out a dishrag. With the release of each posture, fresh blood returns, cleansing, healing, and energizing the tissue. Postures that move your head below your heart or your legs above your hips assist blood flow in the veins and counteract gravity's constant pull on your body.

As you develop your breathing skills, Yoga becomes a remarkable tool for quieting your mind, developing your focus, and increasing your awareness. Maintaining your focus while you ride will improve your riding technique and your bike handling skills as well as prevent mishaps.

Combine all these benefits and you can see that a daily stretching practice and stretching before you ride can make a noticeable difference in your riding performance. You can improve your coordination through freer, easier movement and greater receptivity to your body feedback. I hope you will find that the centering effects of Yoga together with increased flexibility and sensitivity to your whole body will improve your riding technique and bike handling skills. Your body can relax and flow and respond spontaneously without your mind's interference. Your stamina can improve through more efficient breathing and body use. Stretching will benefit both casual and high-performance riders. Lance Armstrong reported that one hour of stretching daily contributed substantially to his training for winning the 2001 Tour de France.

Maintaining a Yoga or stretching practice requires self-discipline. The first step is to design a practical and realistic schedule. You will do well to establish your practice during the off-season of cycling or when you have a less hectic schedule. Then when you feel stressed-out you can turn to your Yoga to reduce tension and regain a balanced perspective. Just as you carefully schedule training rides in advance of a major cycling event, you need to schedule and develop your stretching routine well in advance of the most demanding workload and riding season.

When you begin a regular practice, the vast selection of Yoga postures can be overwhelming. I recommend that you select one or two postures that you like or that are challenging for you to perform and practice those for an entire week. It takes only a few minutes of quality time morning and evening to notice your improvement. The second week, add one more posture. As you become proficient at five or six postures, drop one and add another. In this manner you will learn a repertoire of postures. Then when your shoulders need attention, you can select several postures beneficial for your shoulders. Use the lists and instructions in *Bicycling Bliss* to remind you of postures that benefit any specific part of your body.

Experiencing immediate benefits will keep you motivated to follow your practice schedule. Bob Anderson (*The Stretching Book*) says it takes a year of practice before you mentally connect with stretching and fully enjoy the ease and commitment to your practice. The quality of your practice is more important than its duration. So use these guidelines to increase the benefits of stretching and Yoga.

1. Warm up gradually. Cold, tense muscles resist elongation. Trying to stretch without preparation can result in injury or can even increase tension. Begin slowly and gently, preparing your mind and body for exercise. The moving elephant posture is a fun

and effective warm-up (refer to the following description). Before practice, take a moment to relax. Sit quietly and observe your breathing. If you are breathing in your chest or your breath pattern is erratic, begin slow, controlled breathing using your diaphragm. Try to balance the duration of your exhalations and inhalations. Make the transition between exhalation and inhalations smooth and fluid.

2. *Breathe continuously throughout each stretch.* The benefits of elongation and strengthening will be limited if you hold your breath during any part of a stretch. Give attention to your breathing throughout each sequence. If you are unable to breathe evenly, ease up on the stretch. Mentally direct your breath into the muscles you are elongating. In some postures your movement is coordinated with your breath. The general rule is to exhale when you fold over the diaphragm and inhale as you straighten up. If the breath pattern is not clear to you, experiment until you discover what feels natural and enhances your stretch.

3. *Move without force.* Instead, cultivate these two types of movement:

   a. Release into each posture using relaxation, exhalation, and gravity to increase the stretch. Sink downward with each exhalation. Let go of tension and exertion.

   b. When moving against gravity or improving the alignment of your posture, use gentle muscle strength, intention, and an inhalation. Use the inhalation to open, expand, and extend.

Breathe regularly throughout each posture and focus on isolating the muscles you need to contract and those you need to elongate. Through these two different aspects of practice, you will open your joints, increase your range of movement, build your strength, and avoid the risks of bouncing movement.

4. *Be clear about your intention in each stretch.* When practicing Yoga and stretching, draw your attention inward. Close your eyes and scan your body with curious interest in what you are feeling. When you are stretching during a ride or in a group, let go of any competitive urges or preoccupation with your appearance. Observe your flexibility, relax tense areas, become aware of your body alignment, the quality of your stretch, and the nature of your breathing. You might ask, “Where are the tight spots?” “How does my body respond to the structure of the pose?” “Does the pose elicit any emotions?”

Are you doing what you intended to do? This is especially important as you are learning each posture. If you are practicing without an instructor, look at yourself in a mirror or large window to confirm that you are moving in the direction you intend.

Be aware of your movement esthetics. Practicing postures should lift your spirits and give you pleasure. Avoid angular, jerky, or bouncing movements. They can make you uncomfortable and scatter your mind. Using fluid movements will help you maintain a

quiet attitude. Complete each posture purposefully, returning to the beginning position. Enjoy this moment by bringing your attention to the areas you have worked. What are you feeling? Listen to your entire being. For all standing postures return to the mountain pose, p. 101.

5. *Choose the duration and intensity of each stretch based on your present condition*. Initially, you might hold each stretch 10 to 30 seconds to limber up. As you become more flexible, experiment with holding stretches longer than 30 seconds. Each time you practice, hold postures only as long as you are able to maintain a quiet mind, a steady body, and conscious breathing. If you are exerting yourself or beginning to shake, you have gone too far. Back off or come out of the posture. These parameters will help you avoid pain, which is a clear indication that something is wrong. When you discover extremely tight muscles, you may experience some discomfort. Bring your attention into the area of discomfort and imagine breathing into it. Or imagine the discomfort draining out of the limb or torso. This will relieve your discomfort and reduce the likelihood of muscle soreness the next day. If you have impairments or injuries, facilitate healing by only doing 75 percent of what you normally would.

6. *Select postures that meet your immediate needs*.

   a. Forward bends are quieting, cooling, and relaxing.

   b. Backward bends increase mental clarity and awareness and are energizing and warming.

   c. There are postures that are performed standing, sitting, and lying down. Lying postures are especially enjoyable at the end of the day or after exercise.

   d. Stretch opposing muscles in pairs. For example follow, the downward-facing dog with the upward-facing dog.

7. *Repeat each stretch twice on each side of your body*. This process increases your pleasure by letting you observe immediate improvements. During the first repetition, your mind and body become familiar with the posture. The second time, they acknowledge that familiarity, and you will notice greater ease and improved form. Thoughtfully observe the differences between the two sides of your body. Accept these differences but use the information to help you develop balanced alignment and strength.

8. *Keep these principles of body use in mind*.

   a. Point your feet straightforward or at the recommended angle, bringing relaxed awareness to the soles of your feet. Distribute your weight evenly across the bottom of each foot and both feet evenly. Relax and spread your toes.

   b. Align your knees so they are directly over the respective feet. Do this when your legs are bent or straight. In straight leg poses, contract the thigh muscles

and draw your kneecaps up while engaging the hamstrings. Use balanced isometric tension and avoid locking or hyper-extending your joints past 180 degrees by strong contraction of the quadriceps femoris without a balanced contraction of the hamstrings.

c. During forward bends, pivot at the hips rather than rounding your spine forward.

d. Give attention to all of your body: front, sides, and back. Observe your joints as well as your muscles. While observing your breathing, also observe the flow of energy.

e. When making adjustments to your position, begin at the base and work up. For standing poses, begin at your feet. For seated poses, begin at your seat bones and at the alignment of your pelvis. Since the pelvis is the base of the spine, its placement determines the curvature of the length of the spine. A neutral position balances the engagement of the muscles of the buttocks and the abdomen.

9. *Acknowledge and accept your unique body type.* If you have tight joints, you especially will benefit from stretching. Stretching is not about flexibility but about getting at tight places and releasing them. If you are quite limber, complement your stretching with strengthening exercises to support loose joints.

10. *Use proper equipment.* Many postures will be more fun and relaxing if you use a "sticky mat." These are available through Yoga centers and catalogs. They prevent you from slipping on the floor so you will be able to relax appropriate muscles fully. Wear loose-fitting clothing or knits that allow you to move freely. Remove your shoes and socks. Be sure to regulate your body temperature by adjusting your clothing. Being too cool or too hot will diminish the benefits of centering.

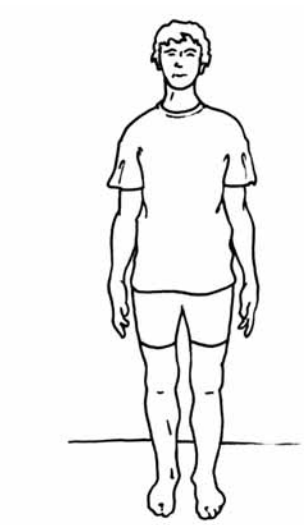
For more details on stretching and stretches for specific parts of the body, refer to Bob Anderson's *Stretching* or to your favorite Yoga manual. Classes will help you get started and maintain your practice. Try several teachers until you find one you can appreciate.

I have used Yoga and stretching interchangeably to encourage those of you who already have a regular stretching practice. However, there are several distinctions between Yoga and conventional stretching. The postures are esthetically pleasing and cultivate a grace that provides another dimension of interest. The essential goal of Yoga is to cultivate physical, mental, and spiritual balance. It is slow and steady, giving the practitioner greater control, safety, and efficiency. The mind must be receptive to the messages the body is sending and make appropriate adjustments. There is a constant interplay between mind and body. You will need to perceive sensations, accept them, and make needed adjustments and refinements. When your mind wanders, draw it back into your body.

Yoga is a philosophy developed in India over many thousands of years. It is much more than just postures (*asana*). Its primary purpose is to quiet the mind and senses in order to develop a steady, balanced awareness. Yoga teachings promote discipline to practice the postures, meditation, and simplification of life style. Because of the rich and ancient traditions of Yoga, it touches people in many different ways. Depending on your personal goals, you may experience increased contentment, increased wellness, and improved balance of body, mind, and spirit. The essence of Yoga is to reduce your suffering by reaching into your inner being and developing a fearless, joyful heart and increased spiritual awareness.

The Mountain Pose is the Basic Resting Position for Standing Postures.

It helps cultivate a sense of balanced alignment in your carriage. Stand upright with your feet together and pointing forward. If your pelvis is wide or you are improving your balance, you may feel more stable with your feet six inches apart. Distribute your weight evenly across the soles of your feet, front-to-back and side-to-side. Let your arms hang along your sides, turning the creases of your elbows and thumbs forward and gently extending your fingers toward the ground. Align your pelvis and knees by engaging both your quadriceps and hamstrings. Do this by drawing your kneecaps up and your seat bones and tailbone down and forward. Open your chest, lifting your thoracic spine forward. Broaden across your shoulders and upper back and lift through the top of your head. Relax your jaw, mouth, and face. Now close your eyes, breathe diaphragmatically, and give attention to how this feels. Engaging your quadriceps and hamstrings lifts your kneecaps and perfectly fits all parts of the knee joint together. If you have sensitive knees, this practice with strengthen them gradually so over time they can withstand intense contraction of the surrounding muscles. (Coulter, p. 311)



Mountain pose

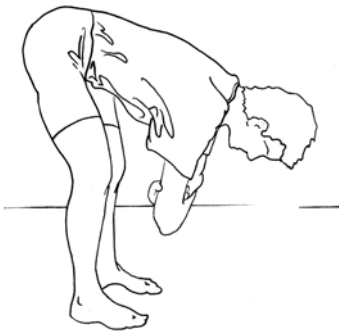
Yoga Sequences for Warming Up

Warming up before moderate physical activity reduces the risk of soreness or injury and improves physical performance.

How does that work? Your warm-up activity increases blood flow to the muscles and joints to be used during exercise. Either breathing harder or gradually working the muscles and joints you want to warm up can accomplish this. Moving directly into vigorous activity without preparation reduces flexibility in your joints and elasticity in your connective tissue. It makes movements awkward, reduces efficiency, and increases the risk of injury and mishaps.

You can either begin your ride slowly and gradually increase your exertion level or start your exercise session with one of the following Yoga sequences. Indoor warms-ups are especially beneficial when you are going outside to exercise on a cold day.

The Elephant

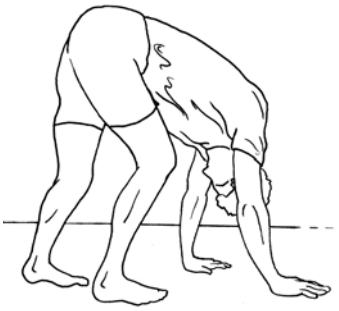


Preparation for the elephant

Preparation for the elephant — Stand with your feet parallel and at shoulder width. Fold your arms across your chest, clasping each arm just above your elbows. Now bend forward pivoting at the hips and keeping your weight forward on your toes. Stop when your torso is horizontal. Let your arms hang relaxed toward the floor. Lift upward with your tailbone. Looking toward the floor, extend through the top of your head, maintaining the natural alignment of your neck and spine. When you have experienced a healthy stretch through your hamstrings and a realignment in your hips, let your torso, neck, and arms relax downward. Breathing should be conscious but will be somewhat shallow with the compression of your diaphragm. Return to a standing position letting your legs do the work by pressing down on your toes and pivoting at the hips. You can work your back and abdominals more by returning to upright by stacking each vertebra gently on top of the previous one. Another option is to finish with a back bend by moving past vertical to arch your back, release your head back, and fully extended your arms upward. Back bends are energizing and will balance your forward bend. Notice in the illustration that the weight is centered over the feet rather than forward on the toes.

The elephant — Repeat the warm-up. At the lowest point in the posture, let your arms unfold so your hands reach the floor.

Be sure your head hangs relaxed so you gaze back between your legs. Keep your arms and legs as straight as possible and imagine you are an elephant. Now walk forward about 20 feet and then back up to your starting place. Breathe continuously throughout your walk. Release your neck and head. When you are finished, return to a standing position and focus on the changed condition of your body and breathing. With your heart and lungs lowered, your breathing and circulation are quickly deepened. Your hamstrings are stretched and wrist and ankles strengthened.



The elephant

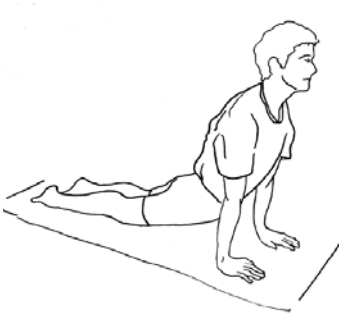
The Downward-facing Dog, Upward-facing Dog, and Child's Pose Sequence

This sequence strengthens your shoulders, arms, wrists, and hands while stretching and relaxing your lower back and your hamstrings. It alternately inverts your internal organs, stretches them, and finally compresses them. This exercise benefits digestion, and breathing. It requires good traction on the floor and is easier to perform on a sticky mat. If you do not have a sticky mat, you can use gloves and bare feet that don't slip on your exercise surface. This sequence is an excellent energizer used immediately upon rising in the morning. It balances energy throughout your body and restores flexibility to your spine and the joints of your limbs.

Downward-facing dog — Starting on your hands and knees, point your index fingers forward and spread your fingers and thumb widely apart. Press the base of your index and middle fingers firmly onto the floor to engage your wrists and forearms. Be sure that your knees are directly beneath your hips and your hands directly beneath your shoulders. Now straighten your legs to form a triangle with the floor, your buttocks forming the apex, and your hands and feet forming the third side with the floor. Pivot at the hip joints. Keeping your arms and back straight and extending your arms fully at the shoulders, let your head hang relaxed toward the floor. Rather than arching your back, keep it flat by rotating your pelvis so that your tailbone is lifted up, and your navel is pressed down. Draw your abdominal muscles toward your spine. So how are your hamstrings doing?

Downward-facing dog

There are several alternatives. If you are able, bring your heels to the floor, feet pointing toward your hands. If your heels don't contact the floor, spread your feet apart to slightly *wider* than hip width. Now alternately flex first one knee and then the other while pressing the opposite heel toward the floor and stretching your hamstrings. Breathe regularly and diaphragmatically for as long as this posture is comfortable. If you find it too strenuous, practice it daily, limbering and strengthening your shoulders, arms, and hands. Gradually your hamstrings will lengthen, and your shoulders will come closer to the floor, resulting in two nice straight sides to your triangle. This is a moderate inversion that should be safe for people with high blood pressure or heart problems. It massages your internal organs, brings blood to your lungs and brain, and rejuvenates you when you are tired (or trying to wake up).



Upward-facing dog

Upward-facing dog — Relieves the back, shoulders, and hamstrings with a backward arch that opens the front of the spine. Continuing from the down dog, reposition your feet so they are resting on the tops with your toes pointed away from you. This can be accomplished one at a time as you gradually lower your hips so that your torso is supported by your arms. You can also make this transition by rolling over your toes onto the tops of your feet. Only your hands and feet will touch the floor. Contract your gluteus maximus and hamstrings so your knees do not contact the floor. Lift from the top of your head and direct your conscious breathing into the parts of your body that are feeling sensitive. Shifting your shoulders slightly forward of your hands makes it easier to open your shoulders and chest.

Child's pose — Relieves the small of your back, opens your upper back, and provides total relaxation. Continue from the upward-facing dog, bringing your knees on to the floor and sitting back on your feet. Bring your chest down onto your thighs and place your forehead on the floor, completely releasing your neck and tailbone. Place your knees far enough apart to allow space for your abdomen and chest but close enough to let your shoulders fully release toward the floor.

Bring your arms down along your sides so your hands are by your feet with palms up. Breathing will be more shallow while your diaphragm is confined. Relax fully and enjoy the sensation of wellness. To come out of the pose, lift your head and shoulder on an inhalation. Here is a nice variation for your neck. While your forehead is on the floor, gently sway your shoulders from side to side over your knees. Let your forehead roll gently back and forth, pivoting your neck while it is fully relaxed.

Child's pose

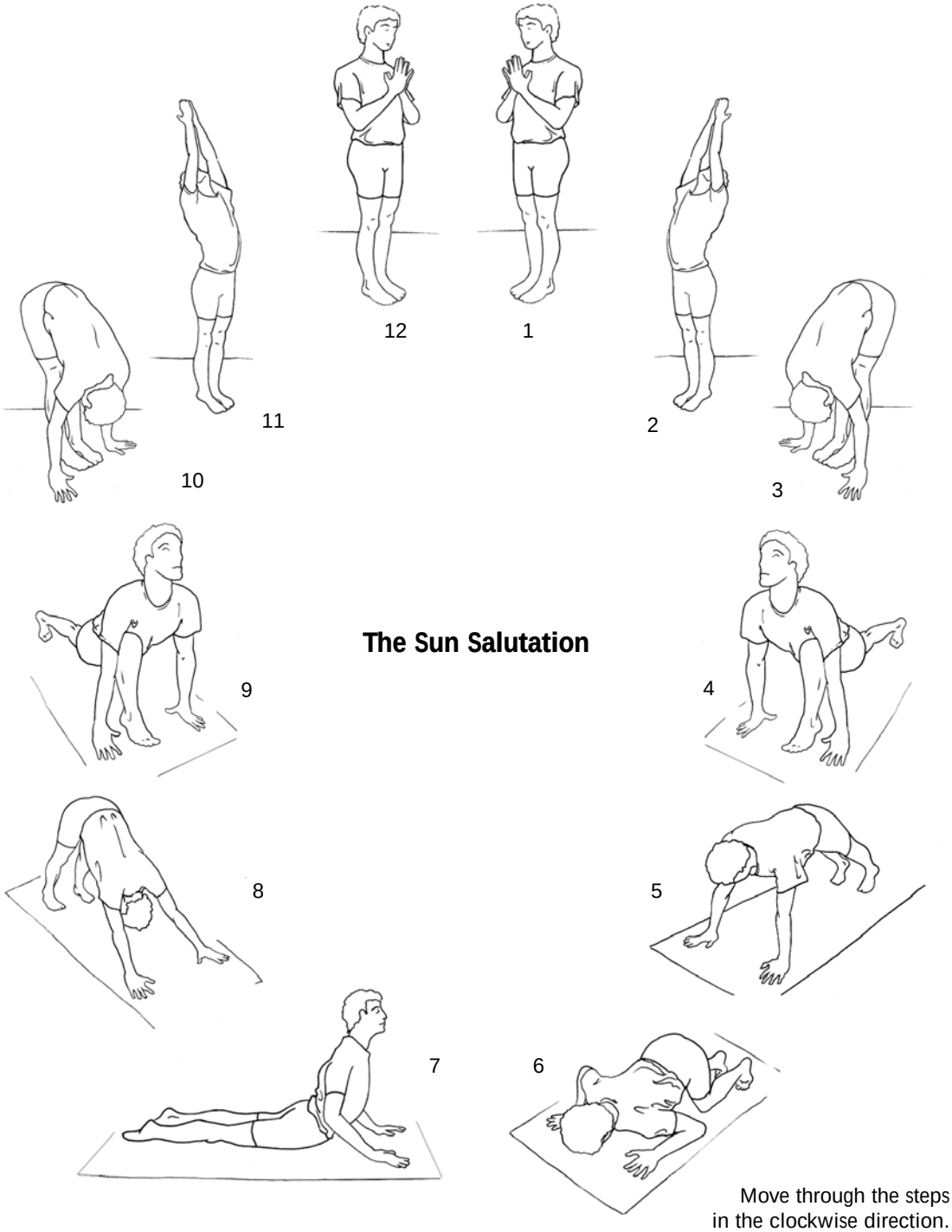
The Sun Salutation

The sun salutation is an ancient tribute to the sun as the source of life. Practicing it with a sense of reverence and gratitude can increase its benefits. You may enjoy performing this sequence outdoors facing the rising sun. It will help you develop conscious breathing since breathing coordinates with each movement. It is adequate by itself because it works all parts of your body. Its benefits include increasing back flexibility, opening the chest, firming abdominal muscles, stimulating digestion, and relieving constipation. Best of all, it raises your energy level and lifts your spirits.

Practice gently, with grace and fluidity. This will help balance your energy. The pace you choose will correspond to your breathing rate. While moving rapidly may scatter your mind, moving too slowly may cause you to strain. Be conscious of each movement and each breath, giving attention to how each side of your body feels, to signs of progress with each repetition, and to your general wellness.

1. Stand erect, feet parallel, toes spread, with your weight evenly distributed across the entire sole of each foot. Place your hands in the prayer position, palms together over your heart. Give attention to the balance of energy in your entire being. Bring your breathing to a conscious, diaphragmatic, restful rhythm.
2. Inhaling slowly, lift your hands up over your head, following them with your head and eyes. Let your hands come to rest when your arms are fully extended. Let your

continued on page 107



The Sun Salutation

Move through the steps
in the clockwise direction.

head relax backward as far as is comfortable with your thumbs above your eyes. If you have any impairment to your neck, do not drop your head back. (Here you may enjoy the variation of arching backwards on the exhalation by firming your buttocks and moving your hips forward and inhaling as you return to an erect posture.)

3. Exhaling slowly, bend forward, placing your hands (or finger tips) on the floor. Pivot at the hips, keeping your back flat until your torso is horizontal. Round your back as you bring your forehead toward your knees, keeping your legs as straight as is comfortable.
4. On the inhalation, step back into a lunge with your left foot as far behind you as possible with your toes on the floor. Raise your head up to look forward. Keep your left leg as straight as possible and let your perineum (floor of the pelvis) sink toward the floor.
5. While suspending your breathing, place your right foot back beside your left foot. In this plank position, keep your torso horizontal so it is parallel to the floor.
6. Exhaling, lower your knees to the floor, then your chest, and finally your chin or forehead.
7. Inhaling slowly, lower your hips to the floor, let the tops of your feet rest on the floor and lift your shoulders off the floor using your back muscles. (You may recognize this as *cobra pose*.) When you have raised your shoulders as far as possible with your back muscles, support your raised shoulders with your arms, drop your shoulder blades, keep your elbows close to your torso and bent back toward your hips. Let your head relax back and look upward. Reduce any possible strain on your arched back by pressing your pubic bone against the floor.
8. Exhaling, bring your toes back onto the floor and then bring your hips up to form the *downward-facing dog*. Pivot at the hips, keeping your legs as straight as possible, and let your head hang down between your arms. Try to form an inverted "V" with straight and elongated arms, shoulders and back. Bring your heels as close to the floor as possible.
9. Inhaling, lunge forward with your left leg. Bring your knee to your chest and your toes as close to forward alignment with your fingertips as possible. Look forward. Again, let your perineum sink toward the floor.
10. Exhaling, bring your right leg forward, placing your right foot parallel to your left foot. Keep your legs straight and bring your forehead toward your knees.
11. Inhaling, stand up while keeping your arms alongside your ears until they are over your head, reversing the opening motion. (If your back is sensitive, move your arms in arcs to your sides to reduce back strain.)
12. Exhale while bringing your hands down to your chest in the prayer position. Bring your

attention to the refreshing sensation of your entire being and let your breath return to normal before repeating the sequence with your right leg.

Always practice this sequence in pairs to benefit both sides of the body. Repeat as many pairs as you like but always return to balance between each set.

The sun salutation is taught in many different forms. If you are used to a different sequence, practice the one you prefer. There are also variations: you might like to add a back rotation after step 4, shifting your weight onto your left hand and foot and bringing your right hand and arm up directly above your left hand so your shoulders are vertical. Keep your hips as close to horizontal as possible to optimize the rotation of your spine. You can hold this position for several breaths or for only one complete inhalation and exhalation before returning to the position in step 4 and proceeding to step 5.

Strength Training for Building Balanced Bodies

If you enjoy working out on weight machines, you can appreciate the value of exercising indoors in a controlled environment. I've never gotten closer to this equipment than the doorway of the weight room. Strength training conjures up images of people sweating and grimacing, entangled in bulky metal contraptions. The equipment reminds me of medieval torture devices. If you too have been put off by the complexity of weight training equipment and the risks associated with heavy weights, let me introduce you to resistance training exercises that can be done at home using little or no equipment. The purpose of these exercises is to make strength building more accessible to everyone and to help you develop a strong and balanced musculature.

This program is to help recreational athletes build and maintain health and fitness. The old adage, "use it or lose it," is strong motivation to develop your own resistance training routine. I hope this essential guidance will get you started building strength, confidence, and an increased sense of well-being.

I have chosen these exercises with two goals in mind:

- to build strength in muscles that are not worked during cycling and
- to strengthen the muscles that support (synergists) and those that oppose (antagonists) the heavily used cycling muscles.

These exercises use your body weight, dumbbells, and ankle weights. All of these fit in the category of free weights since you can carry them around, and gravity provides the resistance. I will not include barbell exercises. Free weights allow more creativity in use than weight machines and are excellent for developing your synergistic muscles (those that play a secondary role in producing a desired movement). They also allow greater variety of muscle involvement and require greater coordination and attention to balance. These

characteristics develop increased joint stability. In contrast, weight machines are highly specific in the muscles they work. Regardless of the resistance training you choose, however, the equipment is not as important as your attention to maintaining good technique. (A noteworthy similarity to cycling!) As you gain experience, you will enjoy the transition from lifting in prescribed movements to concentrating on the specific muscle groups you are working.

Another approach is to use tubing for resistance. Although bicycle inner tubes are sometimes used, surgical tubing is more predictable and more elastic. I mention tubing because tubing is light and compact for resistance training while traveling. To prepare the equipment, purchase 12 feet of tubing and create handles at the ends by tying off a section threaded through PVC pipe. A webbing strap with "D" rings will enable you to secure the tubing around immovable furniture for some exercises. For safety, check the tubing regularly for nicks or cuts so you won't risk having it snap back and hurt you. Resistance can be increased by shortening the tubing, stepping away for the anchor point, or doubling the tubing over. Obviously, it is not as easy to quantify the resistance with tubing. Some of the exercises described here work with tubing such as upright rowing, bent over rowing, and the diagonal hip swing. Refer to Cook and Stewart's *Strength Basics* for a variety of exercises using tubing.

As I reviewed strength-training manuals for just the right exercises, I was surprised and pleased to discover several exercises I do in Yoga. I have been aware of the strength needed to perform Yoga postures and have appreciated that in doing them, I was gradually strengthening weak muscles. However, I had no idea that I would find some Yoga postures popular among body builders! While reflecting on this discovery, I chuckled to think of the wisdom of ancient Yogis to include strengthening with stretching in a regimen to balance one's being. Of course, balanced musculature would be essential to balanced living! For this reason I have included reference to Yoga postures and indicated the muscles they strengthen.

Cross-training is another way to strengthen muscles underused in cycling. Sports that work the upper torso are a wise choice for cyclists: flat-water kayaking, canoeing, rowing, cross-country skiing, and swimming can be enjoyed depending on the convenience of water and the climate where you live.

You can also build strength with yard work and household chores. I love to maintain a vegetable garden and enjoy digging as therapy as well as good exercise. With our severe drought in recent years, I have expended many calories hauling five-gallon buckets of "gray water" to water my yard. To increase my bone density, I made a weight vest with sixteen pounds of weight on my shoulders to wear for 30 minutes a day. An unexpected bonus of wearing this vest is the passive stretch to my upper trapezius and my improved posture. What regular lifting do you enjoy? All this utilitarian lifting contributes to our overall

strength but is not specific in developing our weaker muscles and those that will balance our strong cycling muscles. Weight training tailored to these needs will better prepare us for more demanding activities and reduce the risk of injury from misuse and overuse.

How Resistance Training Builds Strength and Increases Coordination and Control

When muscle cells are not used, they atrophy. (Remember: *use it or lose it*.) With consistent daily use, muscles maintain their strength. When you work your muscles beyond the demands of your normal activity, you stimulate them to adapt to the increased workload thereby increasing strength and stamina. When a rest period follows each workout, the muscles rebuild to meet the greater demand. Progressive resistance exercise means you increase the level of exertion by *small* increments from week to week to stimulate muscles to adapt to an ever-increasing load. The same rest-rebuild principle applies to both strength training and aerobic exercise: overuse without adequate rest prevents the body from rebuilding and diminishes the fitness benefits.

Notice the difference between progressive resistance training with weights and over-extending yourself while riding either by excessive exertion levels or riding substantially greater distance than you are conditioned for. Measuring weights or counting reps enables you to accurately quantify the resistance increments. You can progressively increase the intensity of your work load in small amounts, continually building strength. Bike riding has too many variables to accurately assess your work load. Riding until exhaustion or soreness sets in means that you are breaking down muscle fiber to such a degree that you may require time to heal the muscle damage rather than progressively building up strength.

Let's look at the structure of muscle tissue and coordinated performance of groups of muscles in any body part. Muscle is made up of tiny threadlike tissue called *myofibrils*. These are bundled together to form *muscle fibers*. Groups of the fibers are clustered into *motor units*, all under the control of a single nerve. In any exercise movement, the muscles directly responsible for the action are called the *prime movers*. These are assisted by dozens of helper muscles called *synergists*. *Stabilizers* secure the limb or joint while the prime mover and synergist muscles carry out the motion. *Antagonists* are the opposing muscles that can reverse the movement on command.

We will concentrate on exercises:

- To strengthen the synergists used in cycling
- To strengthen the stabilizers especially in the back and the abdomen
- To strengthen the muscles that are typically weak among cyclists — especially the feet and ankles, abdominals, spinal erectors, triceps, wrists and hands, and neck

Let me emphasize the importance of developing the antagonists of the legs used during the down stroke in pedaling. You need to do this while riding by developing your power on the full rotation of the crank! Don't leave this essential aspect of developing muscle symmetry in your legs to a resistance training program. Well-balanced opposing muscles work in concert and enable you to ride with greater efficiency and reduced risk of injury.

What does strength training do for you?

- Increases your strength
- Builds balanced relationships between muscles
- Prolongs the duration you can enjoy any activity before you get tired
- Protects your joints against strain and pain by strengthening the muscles around the joints and reducing stress on the joints themselves — Take note of this benefit if you have arthritis or other joint inflammation. Improved disposition is an important side benefit.
- Builds denser bones — Muscles and tendons pulling on the bones promotes bone cell activity. Bones benefit from this stress during workouts and during normal activity due to stronger muscles. Listen up all you women over 55 years!
- Helps with weight control — Muscle tissue is active and consumes more calories than fat tissue. As with any regular exercise, strength training boosts your metabolic rate.
- Energizes — With greater strength, it is easier to move.
- Improves your appearance — Your physique will change as stronger muscles reshape your body.
- Increases coordination — Stronger synergistic and antagonistic muscles results in more controlled movement. Imagine several people trying to lift a large, heavily loaded banquet table. If even one person fails to lift at the right moment, the table will not rise or will lurch and spill the food. However, when each person lifts equally at the right moment, the table lifts off the floor smoothly in a controlled manner.
- Reduces frailty even past seventy, making strength training the true fountain of youth

Let's clear up a few myths.

- Spot reduction is not possible. You cannot perform certain exercises and lose weight in specific parts of your body. Consuming fewer calories than you burn will reduce overall body fat but not in designated areas. However, resistance training can increase muscle tone in specific areas, changing your contours.

- You do not have to consume large quantities of protein and vitamin supplements to gain strength. It is less expensive and easier to eat a well-balanced diet. You may need to increase your caloric intake when you increase your activity level.
- If you taper off or stop resistance training, your muscles will not turn to fat. Muscle and fat tissue are distinctively different. If muscles are less active, they get smaller. Just think about what happens when a leg is confined to a cast. It atrophies. It does not turn to mush.

So with a clear understanding of all the benefits of resistance training, let's get started!!

The Basics You Should Know for Healthful Strength Training

Terms that are used for strength training are *lifts*, *reps*, and *sets*. *Lift* refers to each exercise. *Rep* stands for repetitions and is one complete movement of each exercise. A *set* is any fixed number of repetitions.

1. Always take a rest day between strength training sessions. Schedule a 48 to 72 hour break. The *adaptation response* requires this rest in order to build strength. The one exception to this rule is working the abdominals. You can exercise them daily because they are small muscles, and it is difficult to overload them using your body weight. You might enjoy working your upper body on Mondays and Thursdays and lower body on Tuesdays and Fridays. To maintain fitness and health, you will only need two or three sessions a week of 30 to 45 minutes each.
2. Warm up and cool down as a part of each session. If you are doing a 30-minute workout, warm up for 5 minutes, train for 20 minutes, and cool down for 5 minutes. Try the warm-ups described in stretching on pp. 102-108. Or you might walk up and down stairs, and jog in place and then move your arms in all directions slowly without straining: over head, across your chest, and towards your back. It is wise to design your cool-down to include stretches that release the muscles you have worked against resistance. For example, the inner thigh lifts contract the muscles of the inner thigh and groin. Stretch those out gently by sitting on the floor (pelvis vertical), placing the soles of your feet together, and using your leg muscles to gently press your knees toward the floor. (See inner-thigh stretch, p. 186.) Continue each exercise session without interruption to avoid cooling down.
3. Before you begin each session, visualize the exercise you will perform. This will increase the neuromuscular excitation of muscle fibers for greater involvement and improved outcome. (Cooper, p. 200)
4. Perform each exercise with slow, smooth movements. This reduces the chance of strain and optimizes strength-building results. Slow fluid movements recruit more

motor units and involve more muscle fibers in each direction of the movement. Each rep should last about nine seconds, four in each direction with a pause in between. You may find it helpful to count the seconds aloud. This ensures continuous breathing, prevents hyperventilation, and will help you pace yourself throughout your practice.

5. Continuous breathing will keep you tuned in and relaxed. Watch this carefully because you may tend to hold your breath during overload exertion. Generally the breathing pattern for each lift will be to exhale during increased resistance and inhale while lowering resistance. Remember: "Exhale on effort." Let your breath return to normal between sets.
6. Stabilize your body in the starting position. Maintain proper posture by relaxing, elongating through the top of your head, and maintaining the natural curvature of your spine. This means the back of your neck releases and allows your chin to drop. Keep your neck in line with your spine, your shoulders down and back, your tailbone slightly tucked, and your knees not locked or bent. If you have difficulty maintaining this stability, you need to develop more vital strength by working your spinal erectors, abdominals, and shoulders.
7. Keep your joints slightly flexed at the full extension of each exercise. Avoid locking them and causing undue stress.
8. Plan your workouts between meals when possible. If you train too soon after a meal your blood will be in your digestive tract and diminish your effectiveness. On the other hand, if you are hungry you could get light headed. Remember: adequate hydration is important during any exercise.
9. Over time, gradually increase the intensity of your workouts so joints, tendons, ligaments, and muscles develop together. Train consistently and intelligently.
10. Listen to your body to determine the appropriate intensity of each workout and when to increase the progressive exertion level as the weeks go by. Maintain a comfortable exertion level. Discomfort means something is wrong.
11. When you use weights, begin your program with weights that seem too easy while you learn to do the exercises and develop your form. By the fourth session you should be using enough weight so the sixth or eighth rep is challenging. When you progress to 12 to 15 reps, add more weight.
12. You may enjoy setting goals and recording your progress. Keeping track of frequency of sessions, number of reps and sets, rate of movement, number of holds, and amount of weight will ensure that your work increments are small and progressive.

One of the rewarding aspects of strength training is the noticeable increase in strength and coordination. Rapid improvement occurs during the first few weeks but you will improve indefinitely as long as you continue to progressively increase resistance.

Like any specialty, strength training uses some jargon. The names of some muscles and muscle groups have common short forms. You will see the following:

Abdominals or abs - obliques and rectus abdominus — Details to follow.

Hamstrings — the muscles at the back of the thigh that attach at the back of the knee by tendons that look like cords or strings. The one toward the inside of the leg is the semitendinosus. One half of its length is tendon and is not as resilient as muscle. The upper end attaches to the seat bone affecting the lower back. That is why the hamstrings require consistent, patient work by athletes. (Couch, p. 79) Refer to the illustrations in "Your Knees" in Chapter 5, starting on p. 175.

Paraspinals — the muscles on either side of the spine that stabilize and extend the back into an arch. Also referred to as spinal erectors.

Quads — the quadriceps group

Refer to the Glossary, p. 377 and illustrations of anatomy in Appendix D, p. 405-411 for further understanding of these terms.

Strength Training Exercises for Cyclists

It is simple to increase the intensity of your workout when using weights by just adding more weight. For exercises without weights, you can increase the intensity by the following variations:

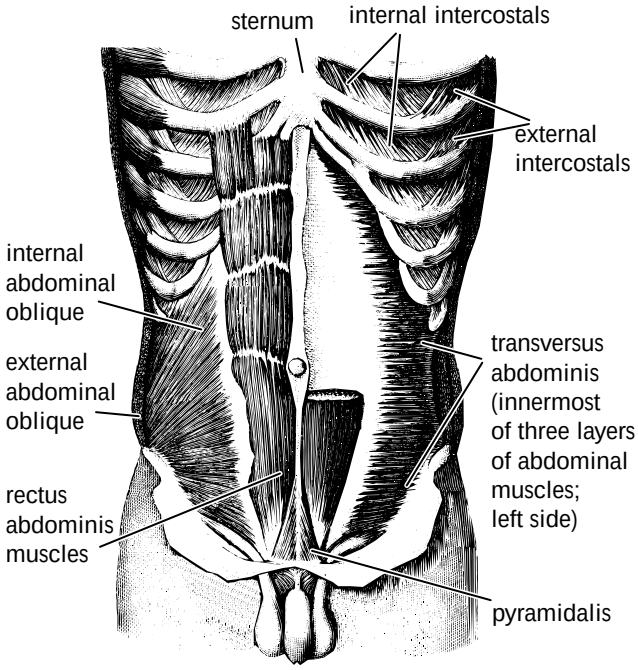
- Increase the height of the lift.
- Move extra slowly.
- Prolong the holds where you are resisting gravity.
- Add holds at about 30 and 60 percent of the full movement.
- Add a rotation to straight lifts such as the abdominal roll-ups by moving your shoulder toward the opposite knee.

Abdominal Muscles

We'll start with the abdominal muscles since weakness there is a primary cause of lower back problems. Strong abdominal muscles, which balance strong lower-back erectors, maintain the healthy lumbosacral angle of the pelvis. They also support the abdominal organs, improving their function, and control the contours of your tummy. They are also the muscles used to support abdominal breathing. Do these exercises three to four times a week, performing 5 to 25 reps. It is important to work both prime movers and antagonists

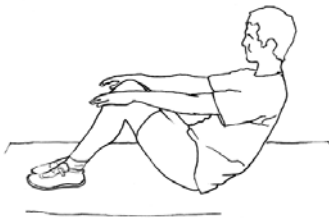
in one session. Notice that the reverse trunk rotation also engages your back muscles. To maintain optimum function and appearance of your abdomen, tone the muscles through regular exercise and then let them release while inhaling and contract while exhaling to support the diaphragm.

Key muscles of the abdomen are the vertical *rectus abdominis* (from the breast bone to the pubic bone) and three layers that encircle the abdomen. The outermost are the *external obliques* running from the lower eight ribs and sides of the waist downward toward the pubic bone in the same direction as the external intercostal muscles of the rib cage. The middle layer is the *internal obliques* running in the opposite direction from the sides of the waist up to the four lower ribs in the same direction as the internal intercostal muscles. The innermost layer is the *transversalis* surrounding the deep abdominal area and running horizontally from front to back. The *pyramidalis* are small muscles just above the pubic bone. Refer to Appendix D for anatomic illustrations of the superficial, intermediate and deep muscles of the body, pp. 405-413.



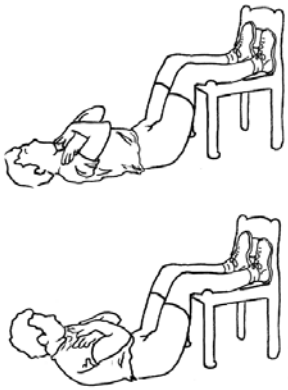
The key muscles of the abdomen form three layers with the outermost rectus abdominis and innermost transversalis sandwiching the external (cut away in this illustration) and internal abdominal obliques. (*Anatomy of Hatha Yoga*)

Transpyramid exercise — The transversalis and pyramidalis muscles are not involved in bending the spine so they are not strengthened by most exercise. They are important in breathing and maintaining a firm lower abdomen. Sit or stand, exhale slowly and when you get to where you would normally stop exhaling, forcefully breathe out more, lifting with your abdominal muscles. If you like, you can assist with your hands on the lower abdomen. Relax, take several normal breaths, and be careful not to hyperventilate. For the best results, repeat this 2 to 5 times several times a day. Do not get overzealous and do more than five at a time.



Abdominal roll-downs

Abdominal roll-downs — Strengthens the upper abdominal area. The stabilizers are the hip flexors. Roll-downs are less intense than roll-ups and do not require a chair. *Starting position* - Sit on the floor, feet flat, with knees bent, held together, and near the chest. Extend your arms straight out in front of you at shoulder height. *Movement* - Slowly lower your torso only as far as you can and still maintain control. At this point, come back up to your starting position. Lower on the inhalation to a four-second count, hold and come up on the exhalation to a four-second count.

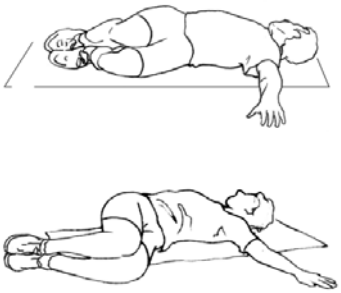


Abdominal roll-ups

Abdominal roll-ups — Strengthens the upper abdominal area. The stabilizers are again the hip flexors. Contrary to common instructions, do not hold your feet down for roll-ups. This causes the powerful hip flexors to take over much of the work *and* stresses your lower back. *Starting position* - Lie on your back with knees bent and lower legs resting on a bench or chair. Depending on your strength, place your arms along your sides, cross them on your chest, or place your hands over your ears with your elbows toward your back, when you are ready to increase your load. Placing your hands over your ears will prevent you from straining your neck by pulling on your head. *Movement* - Leaving your middle and lower back flat on the floor, slowly raise your head and shoulders off the ground 20 to 30 degrees. Pause and slowly lower. Use about a four-second count in each direction to get started. Throughout the movement, look at the ceiling and not at your knees to maintain a neutral neck position. *Variations* - To increase the intensity, you can eliminate the lower leg support, holding your lower legs horizontal in the air. Lift your shoulder at a variety of angles: in addition to lifting straight forward you can also lift toward each knee.

Reverse trunk rotations — Primarily works the internal and external obliques located in the midsection and used for rotation. Refer to the illustrations on pp. 76-77. At the same time, you will balance the abdominal work by engaging several key back muscles. *Starting position* - Lie on your back on the floor, bring your feet close to your buttocks, and rest them flat on the floor. Hold your knees together throughout the exercise.

Extend your arms at shoulder height with your palms on the floor. While performing this rotation, strive to keep both shoulders on the floor. *Movement* - Slowly and smoothly rotate your hips to bring your knees to your left side and touch the floor, exhale. Turn your head to look in the opposite direction of your leg movement. During the inhalation, bring your knees back to center so your thighs are vertical. Repeat to the right. Notice that the breathing coordinates with the action of the diaphragm during the rotation. *Variations* - This exercise is so versatile you can easily adapt it to your immediate needs and never get bored with it. These exercises are listed in order of increasing intensity.



Reverse trunk rotations

a. Draw your knees close to your chest and raise your feet off the floor. Rotate to the left and bring your knees toward your left elbow, hold, raise to the center, and repeat to the right.

b. Raise your feet off the floor, maintaining your thighs at right angles to your spine. Lower your left knee to the floor, again keeping your knees together. Hold, raise to the center, and repeat on the right side.

c. Over time, gradually straighten your legs and lower your extended legs as far toward the floor as possible while maintaining control and being able to raise them back to vertical.

Always repeat an equal number of reps on each side, maintain good form, and stay in touch with all your body sensations. Have fun with these rotations and make them part of your life-long fitness routine!

Yoga postures for the abdominals:

a. The cat, p. 227, stretches and strengthens key abdominal and back muscles.

b. Leg lifts, p. 228, strengthen key abdominal muscles and engage back stabilizers.

During your cool-down, use the camel on page 186 to stretch out the abdominal muscles you have worked.

Full Length of the Back

The full length of the back stabilizes your cycling posture, your control, and the propulsion of your bike, yet full back strength building exercises are disguised as upper or lower back work. The following three Yoga postures will strengthen your back for more power, control, and pleasure.

a. Variations on the cat, p. 227, strengthen the stabilizing back muscles that run diagonally across the length of your torso. The prime movers are the gluts, hamstrings, paraspinals, upper trapezius, and latissimus dorsi.
b. The cobra, pp. 218-219 strengthens erectors and stretches abdominals. Let me encourage you to continue practicing the cobra and experience the delight of rapid improvement. When I first began, I could barely lift my shoulders off the floor. Although I still cannot straighten my arms at the height of the posture, I can lift my shoulder up quite well before assisting with my arms. Give attention to the nuances of this posture to protect your lumbar spine.
c. The spinal twist, p. 217, strengthens rotators, posterior spinal surface muscles, and the quadratus lumborum, an important lower back muscle.

Spinal twist

Upper Body

The upper body work is divided into pushes and pulls. If you ride with a forward lean of more than 15 degrees, strong triceps will increase your comfort. If you sprint and climb steep hills often, strong biceps will help power you. Many high-energy riders pull on their handlebars. I caution you that this puts unusual stress on your stem and handlebars, making it advisable to replace them regularly. When you value endurance over speed, this upper body energy would be better used propelling your bike with your legs.

Neck

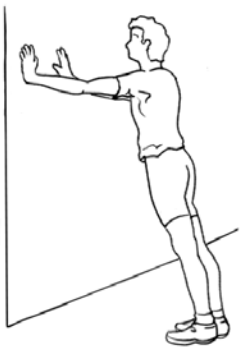
Neck muscle fatigue and pain plague many cyclists. Poor riding posture aggravates neck discomfort but the underlying causes are weakness and tight muscles in both the front and

back of neck! Refer to the exercises in Chapter 5, pp. 239-240. Have fun with this sequence. You lie down for this one.

Upper Body Pushes

Warm up your shoulders and arms with a variety of movements in all directions as described under strength training basics number two, p. 112. It's hard to surpass the effectiveness of pushups. But before you groan too loudly, try these many variations to provide some variety and to work your way gradually into full-body push-ups.

Push-ups — Especially for deltoids, pectorals, and triceps but they also engage as stabilizers the abdominals, paraspinals, gluteals, and hip flexors. Perform any of these variations as slow, smooth, controlled let-downs. This will help you get started at any strength level. The same principles apply to all variations. Stabilize your position, place your hands shoulder width apart in such a position that in the lowered position your hands are just under the shoulders. Bending at the elbows, slowly lower yourself until your nose or forehead lightly contacts the push-up surface, hold, and slowly push yourself up to the starting position. Place your feet or knees at about shoulder width. Do not lock your elbows and resist resting in a full down position. Either of these practices will make initiating the push-up more difficult.



Wall push-ups with arms extended

a. Wall push-ups — Stand at arm's length from the wall. Feet shoulder width apart and knees slightly bent. Place your hands palm down against the wall at about mid-chest height. Be sure your spinal alignment includes keeping your head and neck in line with a straight back. Lower yourself to the wall and follow the general instructions for push-ups.

b. Counter push-ups — These are similar to wall push-ups except your hands are on the edge of the counter, and your feet are backed away far enough so your upper chest will come to the edge of the counter.

c. Knee push-ups — Get down on your hands and knees. Protect your knees from the floor with some padding.

Place your hands only as far forward as allows you to lower yourself slowly with control and then back up again. This could be from kneeling on all fours to full extension with your torso, hips, and knees all in a straight line.

d. Standard push-ups — Begin on all fours, extend the legs straight back, supported on the balls of your feet. Keep your torso and legs in a straight line. Move as described above.

I remember with amusement two young men who were touring by bicycle across the U.S. They camped for the night in our backyard, and the next morning we saw both of them on the patio doing push-ups at a lively pace. I thought perhaps the Marines had invaded during the night. When we inquired about the extreme number and speed of their exercise, they explained that they were so concerned about losing their upper body strength during their weeks on bikes that they decided to do 100 push-ups every morning! That's one way to go at it.

Dips — Strengthen your chest, shoulders, triceps, and back. You'll need two chairs with the seats at the same height. Place the chairs about 24 inches apart, seats facing each other. Place your palms on the seats of the chairs and slowly lower yourself bending until you feel a gentle stretch on the chest muscles. Slowly extend your arms to push yourself back up to the starting position. Keep your shoulders down in the lowered position and do not lock your elbows in the raised position. Letting your elbows bend out to the side, as illustrated, strengthens your deltoid muscles for general shoulder strength. You may choose to let your elbows bend toward your back, strengthening your triceps, which are important in maintaining flexed elbows while riding with a forward lean of more than 15 degrees.

Modified dips

a. Modified dips — Follow the above movement description. Place your feet directly under your buttocks and bend your knees. In this manner you can use your legs to assist your shoulders, chest, and arms while raising and lowering.

b. Standard dips — Follow the movement pattern for the modified dips. Place your extended legs in front of you, slightly bend your knees, and rest your heels on the floor.

Standard dips

Yoga postures — These postures worked together strengthen wrists, arms, and shoulders. Refer to pp. 103-105, downward-facing dog, upward-facing dog, and child's pose sequence. For best results, hold each position one minute or longer. Give special attention to flattening your back and arms in downward-facing dog and keeping your knees off the floor in upward-facing dog.

Wrist rolls with weights — These strengthen your wrists and increase their range of motion as well as counteract the negative effects of repetitive motion stress. Find a solid metal rod, dumbbell, or other heavy object that weighs about three pounds and is about the diameter of your handlebar grip. Sitting in a chair, grasp the weight with your fist, palm upward, supporting your forearm against your thigh. To a slow four-count, let your wrist roll back as far as comfortable and then pivot it back up toward your forearm as far as is comfortable. Repeat this slowly several times. Repeat with your other hand and wrist.

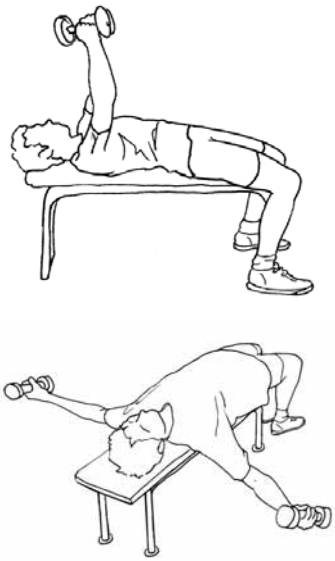
Wrist forward and back bends with weights — Standing with your arms hanging at your sides, grasp your dumbbells or other weights in each hand. Alternately bend your wrists up toward the front (thumbs on top) and then up toward the back (little fingers on top). Keep your arms straight and breathe evenly. Move slowly to a slow four-count in each direction as far as is comfortable.

Manual bike tire inflation — (or if you're ambitious, try your car tires) This is an excellent resistance exercise for your shoulders and triceps so don't shy away from it. Grab the chance to develop your upper body.

Upper Body Pulls

You will need some weights for these lifts. Dumbbells work well because they are balanced, and the small-diameter middle

Bent-over rowing



Dumbbell flyes

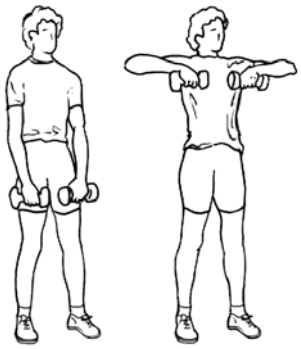
reduces the chance of hand strain. How much weight you work with will depend on your strength when you begin your program. This could be anywhere from three to twelve pounds.

Bent-over rowing — Strengthens the biceps and upper back, especially the latissimus dorsi. The primary stabilizers are the trapezius, deltoids, and pectorals. This requires one dumbbell and a chair. *Starting position* - Stand to the left of a stable chair with a dumbbell in your left hand. Move your left foot back about 12 inches and support your weight on both feet while keeping your knees flexed. Bend over at the hips and place your right hand on the chair to support your torso while keeping your right elbow slightly bent. *Movement* - Slowly pull the dumbbell up until it lightly touches your ribcage and rotate your left shoulder slightly upward at the top of the movement. Slowly lower the dumbbell to its starting position. Perform the desired number of reps and then reverse your position and repeat with the dumbbell in the right hand.

Dumbbell flyes — Strengthen the chest and shoulders, especially the pectorals. You'll need two dumbbells and a bench although these could be done on the floor as a second best choice. *Starting position* - Grasp two light dumbbells and lie on your back on a horizontal bench with your feet on the floor, arms extended straight up with hand above your shoulder and palms facing each other. Open your chest, keep your back on the bench, and keep your neck aligned with your spine. If this puts strain on your lower back, you can put some support under your feet to raise them higher and relieve the back strain. *Movement* - Keeping your elbows flexed, slowly move the dumbbells out to the sides in a semicircular arc until you feel a slight stretching sensation in the chest muscles. Do not lower them below shoulder height. Reverse this movement bringing the dumbbells back to the starting position. Perform the desired number of reps.

Upright rowing — Strengthens the shoulders, arms, and back. Two dumbbells are used. *Starting position* - Grasp two light dumbbells. Stand with your feet at shoulder width and elbows slightly bent with dumbbells resting just in front of your upper

thighs. Bending at the hips, lean your torso forward slightly to avoid arching your back. *Movement* - With your knuckles facing away from you, slowly pull the dumbbells straight up in a vertical line to mid-chest height. Concentrate on lifting the weight with your elbows rather than your hands. At the top of the movement, your elbows will be slightly higher than your hands and at about shoulder height. Shoulders rotate slightly to the rear. Slowly lower the dumbbells back to the starting position. Perform the desired number of reps.



Upright rowing

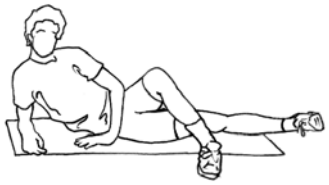
Lower Body

Because your lower body works constantly while riding, these exercises give attention to muscles that are synergists during pedaling. Evaluate your riding style to determine whether you would benefit from resistance training for your quadriceps, gluteals, and iliopsoas. When you use your gears effectively and maintain a minimum cadence of 80 rpm, resistance training on your bike is limited. You can increase the resistance training on your bike by climbing hills or riding with a load of 30 pounds or more. If you ride rolling and flat terrain most of the time, you will increase your stamina by incorporating exercises that build up the strength in your pedaling muscles. With free weights these could include lunges, single leg squats, and step-ups.

You may want to use ankle weights for these lower body exercises. Avoid walking while wearing weights because they slow the response time of your feet and could cause you to fall. Try these exercises first without ankle weights and add weights when your technique is good and when you need the progressive resistance.

Outer-thigh lifts — Strengthen your outer thighs (tensor fascia latae), buttocks (gluts), and lower back. The stabilizers are the abdominals and paraspinals. *Starting position* - Lie on a padded floor surface on your right side while keeping your body in a straight line. Comfortably support your upper torso on your right elbow and use your left hand to help balance your body. Keep your feet aligned forward. *Movement* - Extending the heel of your left leg, raise your left leg smoothly and slowly upward

Outer-thigh lifts



Inner-thigh lifts

about 12 to 16 inches. (If you are not using weights you may be comfortable raising your leg higher.) Do not twist your body out of your original linear position. Slowly lower your leg to the starting position. Perform the desired number of reps and then switch onto the left side to repeat the exercise.

Variations to help you find a position you like.

a. Keep your right shoulder on the floor and rest your head on your right arm.

b. Support your head on your right hand with elbow bent.

Inner-thigh lifts — Strengthen the inner thigh and groin. The stabilizers are the paraspinals, abdominals, and hip flexors. The muscles of the inner thigh are usually weak. Keeping them well-toned will support healthful knee alignment. If your pelvis is wide, this exercise is especially beneficial for your knees. *Starting position* - Start in the same position as for the outer-thigh lifts. Bend your left knee and hip and place the sole of your left foot on the floor in front of your right knee, allowing enough space to lift your right leg. Keep one hip above the other. *Movement* - Slowly, keeping your right foot flexed and aligned forward and your right leg straight, lift your right leg as high as comfortable without leaning your hips forward or back. Slowly lower your leg and repeat the desired number of reps. Roll onto your left side and repeat lifting the left leg.

Toe raises

Toe raises — Strengthen the calves (gastrocnemius and soleus muscles) and feet. Synergist is the peroneus on the outside of the ankle. *Starting position* - Place your toes and the balls of your feet on a two-by-four, shoulder width apart and with your feet aligned forward. For support, position yourself between two chair backs or beside a door frame. To develop your balance, only use support as you begin to lose your balance. *Movement* - Slowly let your heels relax down to a comfortable point below your toes. Slowly rise up as high as you can on the balls of your feet and then return to the starting position. Experiment with holding for a while on the highest and lowest range of movement.

Variations to increase the resistance over time:

a. Use only one leg at a time, keeping your hips level.

b. Hold a dumbbell in the hand of the leg being exercised.

c. To work the synergists, rise up and place more weight on the inside of the ball of the foot and then with more weight on the outside ball.

Ankle rocker

Ankle rocker — Strengthens and stretches the tibialis anterior, gastrocnemius, soleus, and peroneus. This is a standing variation on the foot circles described on p. 171. *Starting position* - Stand with your feet three to six inches apart and aligned forward. *Movement* - Rock slowly around on the outside edges of your feet starting at your heels, roll to one side, to your toes, and to the other side. Your knees should make small, circular motions in the same direction your feet are rocking. Repeat in the opposite direction.

Diagonal hip swings — Strengthen the quadriceps, hip abductors, adductors, and extensors. You will probably want to use ankle weights as soon as you feel coordinated performing this exercise. *Starting position* - While supporting yourself with your left hand on a chair or door frame, bear your weight on your left leg and swing your right leg back and out to the side at a 45-degree angle. Keep the toes relaxed and your right foot flexed without pointing it. On the next four count, swing your leg back through the starting position and across to the left at a 45-degree angle. Perform the desired number of reps, face the other way, and repeat swinging the left leg. Maintain your vertical alignment and avoid leaning with the swing.

Diagonal hip swings

Yoga postures:

a. Warrior strengthens the quads, pp. 211-212.

b. Bridge strengthens the gluts, quads, and inner thighs. It also opens the diaphragm and stimulates the thyroid glands. Refer to p. 213.

When you have built the strength you desire, your emphasis will shift to maintenance. This is the time to be creative. Your understanding of the principles of resistance training will enable you to develop variations on individual exercises and to design your own routine. These variations will

help you maintain your interest and enjoyment. Here are some guidelines for this new phase:

1. Retain your favorite exercises.
2. Vary others to maintain your interest and challenge.
3. Substitute appropriate new exercises, train with a partner or with background music, change the time and location of your practice.

You may come to a point in your training routine when you don't recognize any visible progress. This is known as the sticking point. Continue to work through this with confidence that progress is being made under the surface. It is just like planting a seed in the ground. You can't know that anything is happening until it sprouts.

Empowering Yourself with Affirmations and Visualizations

Your mind is a powerful tool that you can engage to improve your health and your performance as well as to achieve your goals. This may sound strange if you believe your mind is the essence of your being. Instead, consider your mind as one tool in your box of resources along with your body, psyche, spirit, vital energy, social relations, and nature's renewing energy. Too often we waste our mind's power by letting it race uncontrolled, chasing after scheduling demands and daily worries. When we understand how our minds work and how to quiet and direct them, the results will be nothing short of amazing.

The decisions we make, the attitudes we hold, and the limitations we impose on ourselves are created by our minds. However, it is the subconscious that directs, regulates, and implements our actions. Yes, 90 percent of our power resides in our subconscious, leaving 10 percent of our power in our conscious control. How convenient it would be if we could just lift the lids on our subconsciouses and set the dials. Lacking such direct controls, how can we influence them? We must program them with persuasive directives so they become part of our operating systems.

Human internal structure functions much like our state governments. The governor (our conscious minds) offers ideas and direction but most actions depend on the legislature for implementation. However, legislators (our subconsciouses) are influenced by special interest groups, campaign contributions, and lobbyists – all pulling emotions this way and that. Programs may result that benefit the citizens of the state but all too often, intentions become blurred, emotions run high, factions develop, and the final actions rarely bear much resemblance to the ideas of the governors. Only if governors are focused and demonstrate outstanding leadership abilities are legislatures likely to implement their wishes. Our conscious and subconscious minds perform in an analogous manner. The conscious mind creates an idea with the best intentions of designing a plan and getting results. The

subconscious mind, on the other hand, interjects its own agenda causing many ideas to not manifest at all, much less as they were conceived. Our achievement rates can be greatly increased by using affirmations and visualization.

Our motivation to be positive will increase when we recognize that we live in a negative society that dwells on the adverse effects of all aspects of life. You'll need some protection from this onslaught. Devise a plan to reduce your exposure to daily negativity. First, however, you need to address the many negative messages you carry within.

Our training in negative thought patterns begins in early childhood. I'm sure you can remember a few admonitions from your parents: "Don't make a mess." "Don't bump over that chair." "You're clumsy." "You can't play ball as well as your sister." As children we believed these things because our limited experience gave us few accurate comparisons and because no one was counteracting them. Nagging and criticism only make us feel inadequate and bad about ourselves. Having little or no training for parenting, most parents are unaware that the most effective means of changing behavior is to praise desirable behavior. Supporting positive actions builds self-worth and confidence, which are the foundations of further positive actions.

Fortunately, as adults we are not bound to the negative images we learned as children and can reverse ingrained negative images. We can systematically displace them with accurate, positive statements of our worth, skills, and abilities. We can begin by reviewing past experiences and feedback received from thoughtful individuals we respect. We can remind ourselves of our successes in coping with challenging situations in the past. Repeatedly reminding ourselves of these successes can persuade our subconsciouses that the messages of childhood are not valid and that we are capable and lovable.

Another tactic is to consciously avoid negative people and negative discussions. Next time a friend or stranger burdens you with their unsolicited litany of grievances, notice how it leaves you exhausted and in a bad mood. Learn to turn such conversations toward possible solutions and avoid contact with such people whenever possible. If you are forced to work with whiners, learn to be amused by their unfortunate attitudes and perspectives. When discussions deteriorate into complaint sessions, ask yourself if the generalizations of doom and gloom actually do affect your quality of life and if so what you can do to improve things. I'm not suggesting that you become a smiling fool but that you not engage in non-productive recitations of misfortunes and poor judgments. Sharpen your critical thinking by accurately evaluating the circumstances and by focusing on solutions. Avoid reciting everyone else's contributions to the problem.

Be selective in your choice of media, entertainment, and news sources. Distinguish between sensational reporting that creates a sense of hopelessness and thoughtful reporting that includes glimmers of hope and stories of similar situations where individuals made positive changes. Make a pact with yourself to find one positive news story every day.

Where will you find it? Look for publications that strive to inform rather than sensationalize. My favorite is the *Christian Science Monitor* because it gives a consistently accurate worldview.

The next step is to unburden your mind of distractions. Accurate perception of reality requires that you make a conscious effort to remove clutter from your mind and your life. Use the same discerning criteria to choose your activities as you do to select your friends, news, and entertainment sources. Avoid continually chasing after new experiences and social contacts that distract your attention from meaningful goals.

Learn to appreciate yourself and you will find it easier to let go of activities that distract you from achieving your goals. Identifying your priorities requires that you understand yourself. Self-knowledge is more important than all the facts you memorized in school. Take time to recognize your strengths and weaknesses and fully accept yourself just as you naturally are. As you work toward change, be gentle and forgiving. Embrace unexpected results and pitfalls along the way, realizing that they are part of an imperfect process.

Retraining your mind empowers you to influence your subconscious; heal and direct your body; increase your self-love and self-worth; improve your professional a nd physical performance; brighten your attitude; and build nurturing, productive relationships.

The conscious mind addresses the subconscious. The more forceful and vivid the communication, the more effective it is. Contemporary research demonstrates that your brain communicates with the rest of your body and is effective in making changes. (Sarno 1998, p. 145) You must invest time and effort in consciously choosing the direction you want to go if you are to affect change. Rather than thinking, "There is no way I can get over this virus before the bike tour," identify your priorities, affirm your direction, and take action. Try saying, "I am going to get adequate sleep, fluids, and nourishment, and recover in time to enjoy the tour." Feelings of helplessness exacerbate emotional stress and weaken your resolve to affect healing and change. You will have more confidence in your success by acknowledging that you are not alone in your problem but that many people have faced this particular problem. This recognition relieves stress and empowers you to solve your problems. Empowerment is strong medicine.

Make a habit of thinking positively of yourself. Negative self-talk is sure to sabotage your efforts. Instead of saying, "I have really poor stamina," try saying, "I am improving my stamina with adequate sleep, food, and frequent exercise." Rather than saying, "I can't learn to use toe clips," say, "I'm learning to use toe clips to increase my stamina and muscle symmetry." Then proceed to learn and feel confident that you will succeed.

You will improve your performance in all realms of your life by affirming your ability to achieve desired results. Rather than dwelling on the fact that you have undertaken a task that is over your head, tell yourself that you can creatively find a solution even when that

means finding the appropriate person or resource to help you learn the needed skills. Recently I was challenged by trying to create a chart on my word processor and was not making any headway. As I rode to work I thought, "I'm in over my head." I caught myself thinking this limiting thought and displaced it with, "I'm going to think of some creative solution or redesign the chart." Promptly, I remembered I hadn't liked the layout when my designer first created it and visualized another design that I was confident I had the skills to create. I wasted no time stewing about my inadequacies but moved directly on to a solution.

Affirmations are magic for adjusting attitudes. Instead of repeating daily that a work associate is driving you crazy, tell yourself that he or she is the fool in a play or the clown at the circus. Assure yourself that you can be the spectator and respond to your associate's ire or poor judgment without getting sucked in emotionally. I once found myself getting irritated with people who used poor judgment in maintaining their bicycles. That made it increasingly difficult for me to be gracious and help them learn how to care for their bikes. I resolved to change my attitude and examined what made me out of sorts. I began using the affirmation, "I am amused by poor judgment (mine as well as others')." Within a couple days I had no problem being cheerful when riders brought their negligently damaged bikes in for service. I have also enjoyed more frequent laughs at myself when I make poor decisions.

How often we sabotage relationships by negatively characterizing someone important in our lives. By releasing that person from the negative hold we have on them, we can create an honest and positive image in our minds causing relations to spontaneously improve. After many years as an employer, I was startled to discover a disturbing pattern. When I burned out from too many hours at work, I unconsciously began to blame my employees for my self-imposed fate. Rather than searching for solutions within my control, I harbored ill thoughts about certain employees. That is not to say that my discontent with their work was not initiated by inadequate performance but that by directing my negative emotions toward those employees, I sabotaged their ability to perform satisfactorily. It was no wonder that those employees' performance progressively declined until I let them go. Now I understand that the negative energy I directed toward them weakened them and limited their ability to perform up to standards. When I develop a negative characterization of someone, I now take time to identify the origins of my feelings and think of something positive about the person. Otherwise that relationship will spin into a downward spiral.

The first step in using affirmations and visualizing to transform your life is to define your goals and ambitions. Be sure to include your health and fitness goals as well as your life goals. What do you want to add to your life? What do you want to subtract? Removing clutter from your life is an essential step in concentrating your focus on fewer goals. You will achieve your goals twice as fast when you are dividing your energy among three goals rather than six. Your energy goes where your mind goes. When you define your goals and give them your attention, you will achieve them.

Schedule a time without distractions to identify your priorities and define your goals. I recommend a solitary bicycle ride to a quiet place with an inspiring view. Ask yourself what you want to become and what you want to achieve. Take along some paper so you can record your ambitions.

Visualizations are images you create of you achieving your goals. They focus on the process of reaching your goal or on your achieving them. They help you conceptualize the details. They help your mindbody perceive just what you want. Performance imagery involves mentally rehearsing a task while you are relaxed. When the time comes to perform, each step feels familiar, and you will do a better job. Visualizations optimize your performance in strength training, retraining your riding technique, mitigating pain, directing body energy during acupressure, and facilitating healing during Qigong practice. Create an image for body energy that is effective for you. You might imagine healing energy as cleansing spring water or pure, white light.

After you have defined your goals, carefully write out appropriate affirmations. I recommend the system described by Dr. Alan Zimmerman in his CD *GOALS: Good Intentions Are Never Good Enough*. (www.drzimmerman.com/tools/productinformation/cd3.htm) As you formulate your affirmations use these three rules:

1. Use the present tense. Your mind takes information at face value. Although your subconscious may balk at first, be firm and convincing, and it will accept your assertion. Say, "I practice my stretching fifteen minutes every day."
2. Make it personal. These are to transform you; you cannot wish changes into other people. Say, "I have an excellent memory with clear and instant recall."
3. Express a positive direction. Use only positive words. Instead of saying, "I don't tense up when I ride narrow trails," say, "I remain relaxed in challenging riding situations."

Other qualities to include in your affirmations that will make them more fun and effective:

4. Be as specific as possible. Rather than saying, "I am losing weight by exercising daily," say, "I weigh a trim 145 pounds."
5. Include feeling words. Say, "I am amused by poor judgment."
6. Use modifiers such as, "I love myself unconditionally."

You should feel good saying your affirmations. If you feel consistently poor when you say one, it is probably not a good choice for you. Replace it with a different form or an entirely different idea. Your mind can handle 10 to 15 affirmations at a time but effectiveness is increased by concentrating on six or eight.

You will need to be consistent in your practice. Say them each four or five times, three

times each day. You can recite them silently or aloud. The more senses you can involve the better. Visualize your result. Create drawings or cut out pictures to remind you of your goals. Write them down when time permits. Use flash cards. Choose a time when you are relaxed and without distractions. Attach your practice to certain activities during each day. Say them morning and evening and maybe before meditation or stretching practice. I always say mine at the same place on my ride home each night on a bike path where I am not concerned with traffic. It is important not to miss a single practice so you might find it helpful to record them and play them to yourself when you are feeling low on motivation.

How long will it take to see results? Dr. Zimmerman says it could be two days or two years. It takes 21 days to get them into the subconscious. Characteristically around day 10 to 14, you will start making excuses for not practicing. This is your mind resisting change. Make up gimmicks to get through this period. Bear in mind that habitual thought patterns will take longer to change.

Optimize your progress. Select goals that are physically possible. Affirmations are not miracles but they are a means to focus all of your resources on achieving results. Be discrete and share them only with positive people, not with skeptics. Be persistent. Don't be fooled when you observe some progress and then slack off or you will lose ground quickly. Continue saying each affirmation for months until it is fully ingrained and part of your basic nature. Beware of self-limiting thought patterns. Dr. Zimmerman calls these "mind binders." They will consume your energy. Whenever an old mind binder comes up, just tell it, "Get off my back," or "I'm awesome and can handle this!"

Using affirmations and visualizations is really fun. They are personal pep talks that strengthen your personal outlook and empower you. They banish the victim mentality. Surely we would all benefit from some basic ones:

"I love myself unconditionally." "I am worthy." "I am patient, skillful, and understanding in dealing with coworkers and family." "I am full of enthusiasm."

Affirmations heal us physically, mentally, emotionally, and spiritually. "It may sound too good to be true. But the evidence is quite clear. A thought or a goal held firmly, repeatedly, in the conscious mind will eventually seep into the subconscious and become part of your operating system." (Dr. Zimmerman's Tuesday Tip, 4/21/03) I recommend that you subscribe to the *Tuesday Tips* for weekly support in becoming a consistently positive and can-do person. Sign up free at www.drzimmerman.com/free_resources/newsletter/tuesdaytip.htm

Journaling for Reflection and Quieting Your Mind

Journaling will help you get your thoughts and concerns out of your head and down on paper. Writing crystallizes thought.

- Begin by reflecting on your thoughts, feelings, and experiences. How did your day

go? What did you accomplish? What would you do differently? How would you like to handle tomorrow? Or if you journal in the morning before meditation, you might ask: What did the quality of sleep indicate about my degree of contentment? Do my dreams provide any insights (amusements or fears) for me? What challenges does today's schedule provide and how can I address them creatively?

- Think through the challenges and make a plan. Make a list to take with you the following day.
- Nebulous worries sap your strength and accomplish nothing. Try to identify the source of your concern. Determine if there are solutions for this problem. If there are, your worries are not necessary. You'll deal with it at the right time. If solutions are not readily apparent, you can't fix the problem by worrying about it. Put this challenge on your list until you can give it your full attention. Once you focus your energy on any task you will be able to identify appropriate options. Either the solution will become clear or you will discover the next step toward resolution. You might even *enjoy* working toward resolving the challenge.
- Try reading some of your journal entries from previous days. You can monitor the progress you have made and look for patterns in your behavior and responses to circumstances and challenges. Consciously developing new attitudes and choosing new behaviors is a great way to get off the treadmill of life. As a friend so wisely says: the goal is to live 365 unique days each year and not the same one over and over again.

A Testimony to the Benefits of Journaling

A dear friend, Wilma, was traumatized by the suicide of her teenage step-grandson. They had shared a close and loving relationship, and Wilma had delighted in supporting him in his many achievements. The task of sorting out his possessions and cleaning his room had fallen to her while her heart was heavy with grief. During the process, she discovered things that were so emotionally devastating that she decided she could not share them with anyone else. The burden weighed heavily on her and interfered with her sleep and digestive process. Her doctor of many years picked up on her anxiety and emotional burden and prescribed medication to help her sleep and to relieve her indigestion.

Wilma shared this story with me after suffering for months. I suggested she might try to write down her feelings and then destroy her writing if she was fearful someone would discover her secret. The next day she left to return to the state where the suicide had occurred. It would not be an easy journey. She would visit her step-grandson's family and support another daughter during heart surgery.

Six weeks later upon her return, Wilma volunteered the information that she had taken up journaling, and the release was so much more effective than the medication that she had discontinued taking it. She had frequently taken time to herself to journal and protected her little book as a companion in her suffering and healing process.

I recommend you also keep a **fitness journal**. Keep it in a separate book from your mental health journal. Record your observations of the influence of rest, nutrition, and integrated health practices on your performance. As you examine the patterns of your performance, you will become more sensitive to the relationship of your health practices to your sense of wellness. Progress is not just linear so enhance the depth and breadth by keeping tract of subtle changes as well as measurable changes. Be sure to record the number of reps and amount of weight used during strength training so increases can be appropriately gradual to ensure steady progression without injury or other setbacks. If you are inclined to take your pulse upon waking or record ride distances, your fitness journal will consolidate all this information and make it more useful. In any case, have fun and keep your focus on the larger picture of your personal wellness and contentment.

Beginning a Meditation Practice

Meditation has been practiced for thousands of years and is gradually finding greater acceptance in the U.S. The reasons to meditate and the benefits are many and varied. Perhaps the most helpful description in a predominantly Christian culture is that:

Prayer is talking. Meditation is listening.

Another description is: **Meditation is being, not doing.** Avoid judging, conceptualizing, or pursuing intrusive thoughts. Simply breathe consciously, let go of intrusive thoughts, and quiet your busy mind. When your mind chatter stops, revelations will come to you. These revelations may be creative ideas, a welling up of inner strength, a flood of compassion, or an uncovering of hidden emotions. Or perhaps you will simply experience tranquillity and clarity of mind. If you have not practiced meditation, you might benefit from the many books on the subject. Beware of methods that engage you in *doing* things. Here are just a few tips to encourage you to get started.

- Find a peaceful place away from distractions.
- Make yourself completely comfortable. You may choose to sit in a traditional position. I recommend you avoid the full lotus and Zen position with feet folded back under your buttocks. The full lotus strains your knees, and the Zen position cuts off circulation to your lower legs. Try the half-lotus or the cow pose, p. 187, which is especially beneficial for cyclists. Sit in a straight-backed chair if that is more comfortable.

- Begin by closing your eyes to shut out visual stimulation.
- Keep your back and head erect to promote the flow of energy up your spinal column. Support an erect spine by holding your hips vertical. Regularly stretching your hamstrings will make this easier. If you begin to slump, visualize pushing energy up your spine with each exhalation. With practice, this technique will make sitting erect quite effortless.
- To get started, simply observe your breathing. Gradually move into SELF breathing — controlled, diaphragmatic breathing that is Slow, Even, Long, and Full. If that is helpful but not adequate, try three-part or 1:2 breathing. Books on Yoga and meditation will provide many more breathing exercises.
- Whenever your mind wanders, gently release the thoughts and draw your attention back to a peaceful quiet. Initially you may find that visualizations, like imaging an oscilloscope with a flat line on it, help. Imagine that each thought causes the straight line to become wavy and release the thoughts by returning to the straight line. Or coordinate your breathing with an imagined tracing up and down the contours of your body. With each inhalation, begin at the coccyx, trace up the contours of your spine, and over the top of your head. On the exhalation, trace down the front surface of the center line of your body to the perineum.
- When you are compelled to engage in a high-pressure schedule, you may have difficulty settling into meditation and getting in touch with yourself. Try searching your being for your *essential self*. You may look for your essence in a part of your body or just scan your consciousness for the true you. Finding your essential self, however you image that, is wonderfully grounding and mind clearing.
- Chanting a classic mantra or singing can change your breathing with calming rhythms.
- If strong emotions well up, gently breathe into them wherever they seem to manifest in your body.
- Be accepting of what you experience and remain open, free of expectations.
- Continue each session as long as you appreciate the experience but avoid prolonged practice sessions. Ten minutes is a good beginning practice. Your meditation experience should be effortless and revealing.
- Journaling before meditation can get projects and concerns on paper and help clear your mind.

Meditation techniques are vehicles to help you explore and discover yourself. The techniques do not ensure a change in consciousness but do increase the likelihood of

emerging insights. These exercises allow you to personally discover that there are different moods, attitudes, and states of consciousness from your everyday state of chronic low-grade stress. They can enable you to be more aware of your feelings and condition and your *ability to control* them.

Maintaining a regular practice for several weeks will help you experience benefits sooner. Another function of practice is to have the skill available in difficult times. The more we practice the easier it is to initiate meditating when we feel low, vulnerable, highly emotional, or scattered. It may be more challenging to quiet our minds, calm our emotions, and integrate our mind and body during these times, and meditating can help. Transformations during meditation may release worries, reduce vulnerability to life's pressures, or increase compassion. It is quite remarkable that as you practice over the months and years, the ability to quiet the mind and emotions becomes easier. From the initial experiences of spending most of your practice time letting go of intrusive thoughts, you can progress to enjoying an ever-increasing quiet and effortless feeling of inner calm.

I would not be honest discussing integrated cycling and health while ignoring spiritual development. Surely individual spiritual experiences vary widely. I observe that some people possess a compelling drive for spiritual growth, some are nonchalant in their interest, some are indifferent, and still others strongly deny the spiritual aspect of their human nature. I encourage you to make space for your spiritual nature. It can be a reliable source of inner strength. If you have not tapped this resource, it is worth some practice to find and develop it. It can bring balance to your life, increase your energy and contentment, improve your performance in all activities, and increase your joy in all your relationships. Spiritual growth developed through study and meditation can be fulfilling. The cravings and drives manifested in food obsessions, extreme sports, and the consuming pursuit of career or wealth can be symptoms of unfulfilled spiritual practice and development. Balance, both physical and mental, both intellectual and emotional, is a manifestation of continuing enrichment of spirit, body, intellect, and emotions.

In recent years the medical community in the U.S. is acknowledging the relationship of spirit and healing. Increasing evidence brings to light that meditation has a strong healing effect on imbalances in the autonomic nervous system (the involuntary nervous system). Regular practice can influence such disorders as high blood pressure, anxiety disorders, pain, and gastrointestinal problems. Developing a regular, daily meditation practice is a vital tool for maintaining wellness and facilitating healing. (Weil, *Self Healing*, April, 2001)

Responding to Seasonal Change

Seasonal variations are dimensions you can use to integrate your wellness. Since intimacy with nature is diminished by large houses and comfortable cars, we tend to disregard the changes in the seasons. If you'll thoughtfully observe the differences in your

moods and activity levels between July and November, you'll surely discover a contrast. Consciously adapting to these changes can contribute to your health and your pleasure in each season. Try selecting foods that are harvested during the current season. Savor the soft fruits of summer in the summer and relish winter squashes or make some pumpkin custard or bread in the fall.

Fall is a healing season, and you will be wise to respond to the natural urge to slow down, eat more, and sleep longer. The task of fall is to renew yourself from the summer's exertion and excitement and store up energy for the demands of winter. (My apologies to riders in the Southern Hemisphere who must adjust the months mentioned here.) It is natural to eat more when the weather turns cooler, and you need more calories to keep warm. Just avoid overindulging. Spend more time relaxing and getting adequate sleep but keep exercising so you don't lose the fitness you developed in summer. Take time to create an exercise plan that will keep your spirits *and* energy level up during shorter days. Perhaps sharing a fitness class with friends will appeal to you. If you enjoy quiet time at home when the streets are messy, develop your Yoga or Taiji practice. Be sure your winter cycling clothes are ready, and your bike is in good repair (maybe add fenders) so you can ride on sunny, warmer winter days when the streets are clear. It is especially worthwhile to maintain your fitness level from September to the start of ski season if you are a skier.

On the other hand, use your good judgment and restraint to avoid burnout in the summer. Riders often commit to summer riding events, train too intensely, and are burned out by mid-summer. Pace yourself in training for any multiple-day cycling events. Vary the length, energy level, and route of your training rides to keep it fun. Constantly compelling yourself to train increases the likelihood of burnout. Select events that are within your grasp each season. If you have never done a week-long tour, start with a relaxed, three-day tour and take time to build up for a longer tour the next season. It is difficult to maintain balance and pace yourself if you must pressure yourself to prepare.

In the spring, temper your yearnings for warm, dry weather by inspecting your equipment and making sure it is ready. Be especially thoughtful about gradually building up your tolerance to your bike seat. Frequent rides of 10 miles or less will help you condition your butt without damage.

Variety is the spice of life, and the changing seasons can be an inspiration for change.

Some Basics on Massage

Massage aids healing and recovery and increases knowledge of your body and your awareness of its condition. It rejuvenates and integrates your mind and body. The resulting relaxation creates a fresh perspective. Increasing evidence shows that the condition of your musculature reflects the state of your mind and nervous system. Bodywork can improve both and is another route to reach the subconscious mind.

Massage can be performed for you or you can do it yourself. Of course, it is wonderful to have a massage from a professional therapist who is technically trained and whose skills are heightened by years of experience. Regular visits to a nurturing massage therapist will support your effort to care for yourself. However, you can also learn and develop the skills for self-massage and to share the joys of human touch with friends and family. Certainly the most accessible massage is self-massage. You are always available to yourself. You know just where your discomforts are and how you would like to treat them.

How does massage work? Through the activity of manipulating the skin, tissue, and joints, massage increases blood flow, improves range of motion, and warms and softens tissues. This manipulation can be sports-specific when you focus on those muscle groups worked hard by a particular sport. While prolonged activity causes muscles to shorten, massage relaxes and lengthens them, restoring flexibility and comfort. *Cautionary note*: massage should never be expected to take the place of stretching. Stretching lengthens muscles more effectively than massage.

Using your fingers or a massage tool, you can identify tight muscles by locating tender places. When you find those sore and tender spots, you can massage them before complications arise. The increased blood flow caused by manipulation not only facilitates healing but also helps flush out chemicals that cause muscle stiffness and soreness. Manipulation can help open those invisible channels of energy flow in the body called meridians and utilize acupressure points.

Here are some tips to help you:

Gradually increase pressure while working on each muscle group. Begin by brushing your hand over your muscles. Gradually increase pressure as you sense the condition of the muscles and as they relax. Be sensitive to the amount of pressure you apply as well as to the tightness of the tissue you are working on. Superficial muscles must be loosened before it is possible to manipulate deeper muscles. When you first touch the muscles you want to massage, you may not feel any knots. Patiently continue gentle massage until the superficial muscles have released, enabling you to determine the condition of the muscles below. Try this easy experiment. Close your eyes, place the fingers of your hands on your temples, and gently rub them making small circular movements. Do they feel smooth without tenderness? Continue massaging them and the surrounding area for a couple minutes while you direct your breath to them. Now can you feel firm lumps and tenderness below the superficial muscles?

Use a caring touch. Healing benefits can be increased if you focus affirmations of wellness and appreciation on the part of the body being worked. To facilitate the opening of tight muscles, breathe deeply and mentally bring your breath into the area being manipulated.

Seek out and experiment with massage tools. You probably have some stray tennis balls

around the house. They are excellent tools for reaching tight back muscles that are difficult to reach with your hands.

Tennis ball massage — Put two tennis balls in a stocking or sock and tie it off so the balls are held adjacent to each other. Lie on your back on the floor. Select a surface that is soft enough to allow tolerable pressure by the tennis ball. Place the balls under your neck at the base of your skull and progress down your spine to your sacrum. Relax onto the balls and breathe into any discomfort created by the balls. Enjoy the progressive relaxation for two minutes or less and then roll on top of the balls moving them down another inch or two. Gradually work down the back or across your trapezius muscles, applying this relaxing pressure anywhere that you would like to massage. If you have two tender areas, work one or two balls along the line between them. Repeating this in the morning and evening can greatly relax your shoulders, neck, and back. It will also help you discover tender and tight places you may never have reached. Refer to further details under "Exercises to Condition Your Back," Chapter 5, p. 225.

For more details on massage, refer to the many books available on this subject. Joan Johnson's *The Healing Art of Sports Massage* is a concise resource.

Pressure Point Therapy

Acupressure is an ancient Chinese system of applying pressure to key points on the skin to stimulate the body's natural healing abilities. Pressure on the designated points releases muscle tension, relieves pressure on nerves, stimulates circulation, balances vital energy, and inhibits transfer of pain messages to the brain. It supports your ability to understand and participate actively in caring for yourself and the healing process. The purpose of acupressure is to aid and encourage your body to correct its own imbalances.

You are probably familiar with acupuncture that uses tiny needles to stimulate the same acupoints. Acupressure preceded acupuncture in development and continues to be the more effective method of self-treatment for tension-related ailments. Because it uses your hands for treatment, it is available and safe to use any time and any place. Acupressure has no negative side effects but some restrictions are appropriate for people who have specific medical conditions or who are pregnant. You should also avoid applying pressure on bruises, scars, or injuries.

When you are choosing among the tools presented here in this chapter, pressure point therapy is a good practice to begin with. It is easy to learn to do effectively and the beneficial results are immediate. Fifteen minutes a day will be more transforming than the weekly use of massage or stretching. Daily practice is essential to optimize results. To begin, select an area of your body that is particularly tight or causing discomfort and apply acupressure to several points over that area. In addition to opening this area to health and healing, this attention to your needs will nurture you psychologically.

Acupressure points are usually located on or near some anatomical feature that will help you find them such as a muscular cord, a tension knot, or on the indentation or protrusion of a bone. These points are especially sensitive to bioelectrical impulses and conduct those impulses readily. Descriptions of the acupoints will get you close to the point, but the exact location varies among individuals and must be found by touch. You will experience tenderness at the precise point, which you might describe as achy, burning, or tingling. You may also experience referred sensation, for example, pressure on acupoints on the forearm may give a sense of warmth or create movement in your hand.

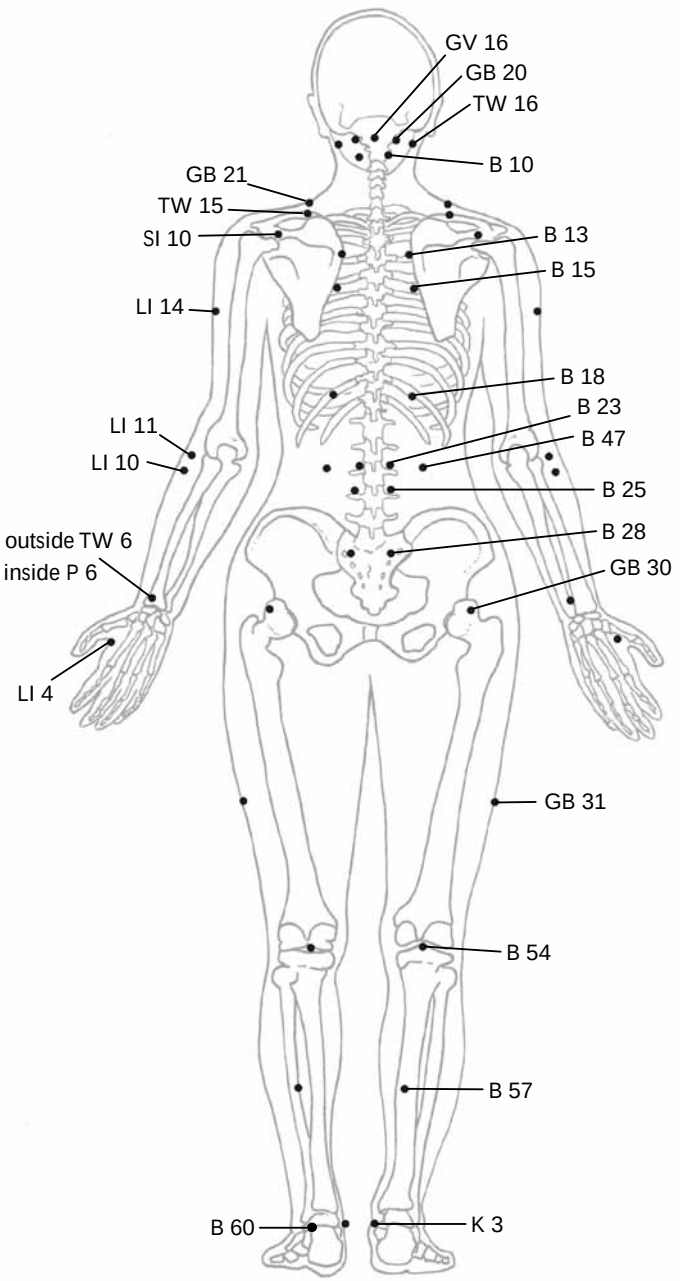
All points are located on energy pathways known as *meridians*, which run lengthwise along the body and are paired on both the right and left sides of your body. Meridians connect every aspect of physiological and anatomical function. To function well, every part of the body must be in balance and work in harmony with the entire system. If these channels are healthy, the entire system works harmoniously. If they are damaged or inefficient, messages are not clear or not in sync, and the entire system suffers. The Chinese identified this system more than 2,000 years ago. Today, modern medicine has been able to confirm this network using sensitive electrical measuring devices.

You might think of meridians as the routes by which the mind pervades the body. When you feel a certain emotion, body and mind are transformed simultaneously as predictable chemical processes at the cellular level are elicited by the emotions. You need not ask whether the mind or body initiates the response or restricts the mind to the brain or some invisible mysterious realm. Emotional and physical health are tied together by one system. Western science attributes these phenomena to neuropeptides while Chinese science attributes them to vital energy or qi. (Cohen, p. 224-226)

Most meridians are named after internal organs. Rather than referring directly to the physical organ, the names refer to bodily functions. For example, according to traditional Chinese medicine the health of the immune system is governed primarily by the condition of the kidney, liver, lungs, and spleen. Stimulating acupoints along these meridians

A Key to the Standard Names and Abbreviations of Meridians

B	Bladder
CV	Conception Vessel
GB	Gallbladder
GV	Governing Vessel
H	Heart
K	Kidney
LI	Large Intestines
Lu	Lung
Lv	Liver
P	Pericardium
SI	Small Intestines
Sp	Spleen
St	Stomach
TW	Triple Warmer



As you practice acupressure using the points given under each body part in Chapter 5, refer to this anatomic chart to help you locate them. To simplify organization, acupoints are listed with the body part where they are located. You will also find descriptions of their broader benefits and effects on distant parts of the body.

does fortify these organs, but also recharges the body to increase resistance to the inevitable stresses and strains of daily life. (Gach, p. 53) Each acupoint has a poetic name but I will use the letter-numeric designation. For example, a point key to the entire nervous system is Heavenly Pillar or B10. (Gach, p. 22) That designation means it is the tenth point on the bladder meridian.

Three meridians have names that are body functions unfamiliar to Westerners. The triple warmer's function is to regulate the balance of heat and moisture in the body. The upper warmer is the head, chest, heart, and lungs. The middle warmer is the solar plexus, including the spleen and stomach. The lower warmer is the lower abdomen including the liver and kidneys. (Cohen, p. 166) I hope this description of an ancient system will make it feel familiar and more accessible to you.

The benefits of acupressure will be optimized when you select a quiet and relaxed environment. Use SELF breathing and bring

your attention to the healing point. Visualize increasing the strength and flexibility of the area, and if pain is present, visualize it leaving your body. Avoid practicing after a heavy meal when your blood is diverted to your digestive system or when you are especially hungry. Wait for about an hour after eating. If time and place permit, enjoy a hot herbal tea or a period of deep relaxation after practice.

Cultivate an appreciation for good technique. Direct pressure toward the center of your body but you can experiment with the angle of approach to find the most sensitive point. Before applying pressure, massage the area surrounding the point. Unless the area is extremely tight or painful, probing for the exact location will be adequate. This massage warms and relaxes the superficial muscles increasing access to deeper tissue. Gradually apply pressure, hold a steady, penetrating pressure, and then release gradually. Time lapse might be five to ten seconds to gradually apply pressure, thirty or more seconds to maintain pressure, and release gradually over five to ten seconds. You will generally experience an aching or "good hurt," but if it hurts a great deal, use a lighter touch. You may use your middle finger, thumb, or three longest fingers but the middle finger on each hand is the strongest and most sensitive. Limit practice on any area of the body to 15 minutes since the effects can be quite strong. If you stimulate several points on your legs, avoid exerting them the rest of the day. In addition to direct pressure, you can experiment with using a slow kneading motion, brisk rubbing to create warmth, or repeated patting with finger tips or a loose fist.

As you gain experience, you can customize your practice to your needs. You will notice as you apply pressure to each point that the tenderness subsides with time. You can begin to release pressure as the tenderness diminishes. As you become familiar with the response of each point, you can concentrate on the more sensitive points that need attention and skip ones that are not sensitive. However, be sure to foster energy balance by applying pressure to the corresponding points on both sides of the body. If the point on one side of your body is more sensitive than on the other side, give it more attention. Use the variations in sensation as a guide to your current state of health and physical condition. As you work any area, begin closest to your head and work away, opening the channels of communication from your central nervous system. When you are finished working an area, brush your hand over the area with gentle strokes to draw excess energy out of the area.

Treatment can benefit muscles and nerves at the site of pressure as well as muscles and organs distant from that point. These are referred to respectively as *local* and *trigger* points. If you have an injury, do not apply pressure directly to the sensitive, injured area since the stimulation could increase inflammation.

There are many resources to guide your practice. I have drawn the suggested exercises in Chapter 5 primarily from Michael Reed Gach's *Acupressure's Potent Points: A Guide to Self-Care for Common Ailments* and Marc Coseo's *The Acupressure Warm-Up for Athletic Preparation and Injury Management*. You may also choose among Shiatsu books. Shiatsu

developed in Japan from Chinese origins. It applies firm, rhythmic pressure along a series of points on one meridian. Reflexology is another pressure point therapy developed in the U.S. that activates points that correspond to body parts and organs. The points are primarily in the feet and secondarily in the hands. Still another system coordinates points in the ears with muscles, joints, and organs.

Acupressure benefits athletic performance by promoting properly balanced physical, mental, and psychological attitudes. Competitors often achieve a personal best performance following acupressure or acupuncture. They benefit from increased circulation warming muscles and joints, improved coordination resulting from adequate communication between brain, nerves, and muscles, stronger muscles, complete range of movement, and stable joints.

Acupressure can be used with stretching as a warm-up. Refer to Coseo's *The Acupressure Warm-Up* for stretches beneficial to each meridian. You can custom design a warm-up to stimulate joints and muscles that are used heavily in cycling or whatever activity you are beginning. You can give attention to parts of your body that are susceptible to injury or have been injured previously. Try this sequence of acupoints designed for over-all warm-up. Apply pressure with your thumb on the palm side of each joint of your ring finger on both hands. Then use GB 34 and St 36 just below the knees. Pressure point therapy can also be used as a cool-down to reduce stiffness or soreness and speed recovery.

On long rides or multiple-day tours, you can use acupressure while taking a break to increase comfort, energy reserves, and relaxation.

Vital Energy

The condition of your vital energy is an important determinant in your well-being. This energy is distinct from the rejuvenating energy of sleep, the metabolic energy from food, and the power of conscious awareness. It should not be difficult to understand this subtle energy since there are many energetic processes in your body. They include the beating of the heart, peristalsis, and the manufacture of hormones and enzymes. (Weil, 1983, p. 151) Sadly neglected by Western allopathic medicine, this component of human nature is described, cultivated, and valued by other cultures around the world. The Chinese know vital energy as *qi*, the Japanese as *ki*, and Yogis as *prana*. Qi is the vital force upon which many ancient Asian healing arts and martial arts are based. It is a life force that influences your vibrancy. Recognized by the Chinese since before 2000 BC, the concept and practice of cultivating qi is not confined to one philosophy or religion. Practicing Qigong is no more Buddhist or Daoist oriented than taking vitamins is Christian oriented. (Zi, p. 165-166) I will draw on the Chinese tradition for concepts and terminology because the Chinese have recorded their understanding of qi for thousands of years, and I have studied it in greater depth than other traditions.

It is easier to describe the benefits of qi than to define it. Qigong is the practice of cultivating qi and its application to healing and harmony of mind and body. Taiji Quan is one form of Qigong practice developed for martial applications. It uses slow, graceful, choreographed movements. The primary benefits of Qigong are that it:

- Increases awareness of your body, your energy and energy distribution, your mental condition, and your spiritual dimension
- Balances your body, mind, and spirit into an integrated whole
- Regulates your immune system
- Promotes healing
- Facilitates digestion
- Warms the body
- Mitigates pain
- Heightens creativity
- Heightens self-defense skills

So what is the nature of this remarkable energy? The Qigong discipline divides qi into prenatal or original qi and postnatal qi, which is absorbed from nature, nutrients, air, and water. Qi is the life energy that flows through all living things. A dead person has no qi. A healthy person has more qi than an ill one. Health implies more than an abundance of qi. In a healthy person, qi is clear rather than turbid. It flows smoothly throughout the body rather than being blocked or stagnant. You might think of qi as an inner energy supply. Every day you draw on this energy, and the supply is diminished with age if you do not recharge it through proper nutrition and healthy mental and physical activities including meditation, exercise, and abdominal breathing. Qi is dissipated rapidly by excessive indulgences in food, sex, substance abuse, and other unhealthy activities. When you are young, qi is abundant and circulates freely without much effort. As you age, qi is less abundant and circulation is impeded by muscle tension. As qi withdraws, it first leaves your extremities: the fingers, toes, hands, feet, head, arms, legs, and so on.

Qigong is the art and science of regulating internal energy to improve health, calm the mind, and condition the body for optimum performance in sports and the arts. The practice involves healing postures, movement, self-massage, breathing techniques, and meditation. You will derive the best benefits from daily practice. An early morning session of 20 to 40 minutes should focus on maintenance and self-nurture. Another session later in the day would emphasize learning and developing new skills. Qigong is fun, economical, and requires no special equipment. It is easy to practice on business trips, bike tours, or in your back yard. It can be done standing, sitting, or lying down so it is ideal for the differently-abled. Classes, books, and video tapes of Qigong exercises are readily available. I recommend Kenneth S. Cohen's *The Way of Qigong: the Art and Science of Chinese Energy Healing*. See www.qigonghealing.com.

To appreciate the function of vital energy within your body, you need to understand some intangible features. In the Qigong discipline, energy circulates through *meridians*. Refer to p. 139. The primary center of energy is the *dan tian*, which is in the center of the body, half way between the navel and the pubic bone. Notice how this corresponds to your center of gravity, of movement control, and the muscular movement of abdominal breathing. This is where the Qigong practitioner plants the seeds of health, longevity, and wisdom (in the heart-mind). The *bubbling spring* is on the bottom of each foot, one-third of the way from the base of the middle toe to the back of the heel. Earth qi passes through this point to enrich your qi. It is an acupuncture point as well as a focal point for grounding your being. The Qigong classics state that qi begins at the feet, is controlled by the waist, and manifest in the hands. If this sounds strange to you, shake yourself, loosen up, and remember that the most important things in life are intangible.

The principles of Qigong practice require an unfamiliar use of your body. In Qigong, the body sinks, lowering the center of gravity and energy level. Knees and hips are slightly flexed, and the abdomen muscles are loose. The feet are rooted, increasing balance and stability. Shoulders are dropped, and the neck is empty, letting energy rise to the top of the head. Generally, the body below the waist is heavy and above the waist is buoyant. The attributes of Qigong are awareness, tranquillity, effortlessness, sensitivity, warmth, and rootedness. The resulting use of your body is remarkably different from Western habits. I am fascinated to discover that this style of movement is characteristic of the natural grace of small children and the goal of the teachings of Yoga, Alexander Technique, Feldenkrais, and Rolfing. With deep abdominal breathing vital to their foundation, these techniques appear to be universal, intercultural, and timeless. Why are they not widely appreciated in the West? Probably because we believe we must exert effort to acquire a new skill. The idea of sinking our energy and surrendering to a deeper wisdom beyond our conscious control causes us to fear some mysterious meltdown.

If you study Yoga, you may be familiar with another organization of vital energy. In Yogic tradition, energy gathers along the spine, moving up to the *third-eye* (above the nose, in the center of the brow), and the crown of the head. These energy centers, or *chakras*, are vertically aligned along the spine and extend from the base of the spine to the crown of the head. They are not physical like nerves but are a series of energy centers that regulate and control the neuro-hormonal system that in turn controls the mindbody functions. (Kriyananda, p. 197) The purpose of practicing Yoga postures, *asana*, is to align and cleanse the body and to balance the lunar and solar energies, enabling energy to freely travel up the chakras to higher states of consciousness.

My Personal Experiences with Taiji Quan

I first became familiar with Taiji as a graduate student in the early sixties. My

Taiwanese house mate, Betty Chao, practiced her form every morning in our living room. I was fascinated by her discipline, serenity, and focus. We were close friends, and I asked her to teach me what she was doing. She told me it was a form passed down through the family and taught to her by her father. Every morning she would show me another move, and I learned the entire form my mimicking Betty. For two years I practiced faithfully every morning. I was motivated by the grace of the movement, the sense of well-being, and the clarity of thought that filled me during practice and stayed with me most of the day. When I was drained while studying for exams and writing research papers, a 10-minute break to practice my form would restore my focus and revitalize my energy. It was actually better than sleep. Wow! It cost nothing, was legal, fun, and satisfying!

After graduate study in textile chemistry, I married, lived in Germany for two years, completed an M.A. in German, and bore two sons. Twenty years later, I resumed my Taiji studies in Golden, knowing I needed the benefits of my practice. Since 1986, I have started each day with Taiji and until 2000 I attended weekly correction classes. Since I began studying Yoga in 1996, I have added several Yoga postures and seated meditation and additional Qigong exercises to my morning ritual. That is a 20 to 40 minute investment in the quality of my life and my daily performance. My motivation remains high. If I miss a practice due to poor planning, the quality of my day is noticeably diminished. Why would I choose to set myself up for a fatiguing and scattered day?

On several occasions I have experienced remarkable benefits from my practice. One day I had a failed root canal. In the process, a nerve was mangled, leaving me in considerable pain. As I went to class that evening, I wondered why I wasn't going to bed instead. During class I managed to focus on my practice and much to my astonishment, the pain completely dissipated. What joy and relief!

Early in my practice I was taking a cross-country ski clinic, and my hands became uncomfortably cold. This day was windy and cold, and the ski suit I was wearing constricted circulation at my elbows. I put on all my mittens but my hands remained miserable. As I stood waiting for my turn to practice the demonstrated technique, it occurred to me that I might be able to move my qi into my hands and get some relief. I concentrated on moving my energy into my hands. Within seconds my hands became vibrantly warm. With that success, my dedication to Taiji ratcheted up another notch.

More recently I was having some plumbing done at my house and needed to locate the sewer. A Taiji friend suggested that her husband would be willing to come over with his divining rods and search for it. After Taiji class that night, Michael, his 10-year old son, and I had fun walking around my yard each with our wire coat hangers bent in L-shapes. We held the short end in the loose fists of each hand and delighted in watching the wires move freely in our hands crossing each other at specific places in the yard. The problem was that they were too active, and we couldn't decide which spot might be the sewer.

Months later after I had located the sewer by another means, I decided to take my divining wires out again and see how they responded to the known sewer location. I was disappointed when the wires hung motionless in my loosely closed fists. Perhaps my qi was weak. After all, my previous success had been directly after Taiji class. So I did my form and tried again. To my delight, the wires moved actively once again. These are experiences where qi has helped solve specific problems or its effect has been demonstrated physically.

The Contribution of Vital Energy to Integrated Wellness

Integrated wellness depends on developing the awareness and skills to maintain the quality of your vital energy and to ensure its even flow and distribution. Your body holds tangible and intangible blockages. The most common blocks are muscular tension created from overuse, misuse, and stress. You can usually identify them during massage as hard, tender places. Other blocks are more subtle and result from unresolved emotions and psychological pain, either from abuse, denial, or a sense of vulnerability. You may assume a protective posture as a sort of character armor. This unnatural and imbalanced carriage is maintained by the chronic contraction of certain muscles. Vital energy is blocked by this tension. Hips and shoulders are the most common areas of stored tension. When you consider the critical relationship of the hips and shoulders to the spine, you may have a new appreciation of the negative impact on back health caused by muscle tension and misalignment in these areas. Refer to the discussion on hips in Chapter 5, p. 190.

There are many video tapes and books on various vital energy techniques but the guidance of an experienced teacher can help you avoid mistakes and provide inspiration. Weekly classes are a good beginning and can help you develop the discipline to practice daily. Try this exercise from Kenneth Cohen as an example of how you can center yourself and tune in to your energy flow.

1. Sit in an upright chair with the soles of your feet flat on the floor and close your eyes.
2. Let your weight sink downward so you are supported by the floor and the seat of the chair.
3. Open your spine by letting it feel spacious with each exhalation.
4. Release your sternum and let it float upward and forward.
5. Release the back of your neck so your chin drops down about a quarter on an inch.
6. Release your jaw and let your tongue rest loosely and flat on the bottom of your mouth.
7. Release any tension in your eyes and let your eyes be lightly closed.
8. Relax your abdomen so it is completely free and open.
9. Create room for breath and shift your position to release any tension.
10. Rest your mind to your dan tian.

Part of the wisdom of internal Qigong is the discovery of emptiness and the cultivation of awareness of quiet, peacefulness, and the mind free of concepts.

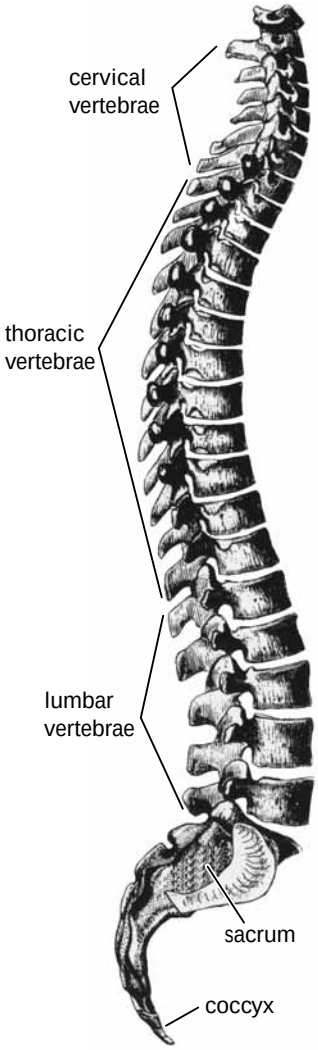
When energetic flow is established, you feel "connected all over." In contrast, notice how you lose touch with any part of your body that holds tension. As tension spreads, and body sensation diminishes, mental activity increases until you may believe your thought process *is* your entire self. Cultivating vital energy integrates your mind, body, emotions, and spirit, thereby increasing your integrity. You will also enjoy a greater interconnectedness of your body parts.

The ability to guide the movement of vital energy enables you to energize yourself at will. Practicing the following exercise will help you discover that fatigue is strongly influenced by attitude and the condition of your vital energy.

1. Sit on a bench (with your knees lower than your seat bones) or sit Indian style on the floor. You'll want to remove your shoes and may want to sit on a towel or blanket to raise your seat bones above your feet.
2. If your chest is collapsed, you can open it by clasping your hands behind your hips, putting your palms together and straightening your elbows. Enjoy that open-chested feeling. Then put your hands back in your lap and relax.
3. Hold your back as erect as if it was suspended from the top of your head. Release your shoulders downward. Now focus on your back to find its natural curvature. Use only the muscles necessary to support yourself.
4. Begin at your tailbone and visualize gradually lifting energy up your spine.
5. Use SELF breathing and take a few minutes to relax and enjoy the feeling of natural alignment.
6. If you begin to slump, visually push energy up your spine with each complete exhalation. With each inhalation visualize opening the flow of energy through each extremity one at a time and draw it to your spine.

You may be surprised to find yourself feeling energized and renewed. This exercise is helpful for centering at the beginning of meditation. You can use it to energize yourself any time you find yourself slouching. Erect posture is essential to effective breathing since slouching confines your chest and diaphragm and inhibits free movement of the abdominal muscles.

Daily practice of Qigong increases your general sense of well-being and promotes healing of illness and injury. You can facilitate healing yourself as well as seeking the help of Qigong healers. Qigong is especially effective in increasing circulation, reducing inflammation, mitigating pain, and soothing digestive disorders.



A side view of the vertebral column

Usually the first four bones of the spine are fused and form the coccyx or tailbone. The next five vertebrae are fused to form a large triangular bone, the sacrum. The lumbar spine is the next five vertebrae, which are the largest moveable portion of the spine. The thoracic spine is formed by the next twelve vertebrae. The neck or cervical spine has seven small vertebrae. (*Anatomy of Hatha Yoga*)

When qi is projected externally, it enhances your sensitivity to others and your ability to communicate. In Chinese traditions, cultivation of qi and creative performance are intertwined. Qi contributes to releasing creative energies and projecting outstanding performance by calligraphers, painters, singers, and martial artists.

Regular practice cultivates fluid and efficient movement. Through conscious intention and movement of qi, you can learn to release contracted muscles and organs. This subtle freedom enhances agility, balance, and relaxation. Vital energy gives a new meaning to relaxation. By drawing on your vital energy, you can enjoy relaxation while supporting your body in an upright position. You may have learned at an early age that pouring on more energy will optimize your performance. Sometimes less energy is more effective. Now you can rediscover how the skillful use of your body optimizes performance. Your increased sensitivity and control will enable you to respond to your body messages that tell you which movements and energies improve your performance. Both your skills and stamina will improve.

The emphasis on strength and power in sports focuses attention on muscle contractions in movement. Releasing tension in non-working muscles is just as important! In retraining your riding technique, you will learn that releasing your old style is a crucial step in establishing a new riding form. Subtle changes can be more easily manifest by directing your energy through conscious intention rather than by muscle contraction.

Contrast the energetic level of these two riding postures. The slouched rider on the right has relaxed the muscles needed to support her for efficient riding form. The rider on the left is using energetic intention to extend her back. By releasing the muscles that pull her down, she frees the appropriate muscles to let her float up. Alexander Technique refers to this as our natural "anti-gravitational force." This example of intention is more efficient, maintains a healthy spinal curvature, reduces neck strain, and can be sustained for prolonged periods without fatigue.

Which of these riders is more energetic and having more fun?

Practicing Tools for Integrated Wellness Will Improve Your Cycling Performance

Over-training, injury, and central fatigue are caused by excessive activity. You may ride beyond your comfortable stamina level, overuse a misaligned joint, or work too long at the office or on a pet project. Frequently the resulting exhaustion is not followed by sound sleep. In fact, immoderate activity usually distracts the mind and results in further excesses. You may even continue to careen out of balance until you become ill, injured, or emotionally agitated or depressed.

Tranquil exercise is grounding and can establish an equilibrium that reduces the risk of wide energy swings. Rather than focusing exclusively on physical fitness and sport, devote time and energy to emotional, spiritual, and vital energy fitness.

Ken Cohen recommends the following tranquil exercise sequence. Practice every morning for 40 to 60 minutes. Exercise between five and seven o'clock before eating. Perform 10 minutes each of seated meditation, Yoga, Qigong, and Taiji or other tranquil exercise. After practicing this routine for several months, I am able to work longer without fatigue, maintain a more compassionate disposition in difficult situations, and ride with more stamina and improved technique.

Upon rising you might try these exercises:

1. The cat
2. Two repetitions of downward-facing dog, upward facing-dog, and child's pose
3. Ten minutes of seated meditation (I like to sit in cow pose for five minutes on each side. Be sure to choose a position that is comfortable for you.)
4. Yoga postures: seated spinal twists, preparation for the elephant, and triangle or sun salutation
5. Qigong exercises to cleanse impure qi, gather qi from nature, and move qi throughout the body
6. Taiji: Yang short form

As your skills improve, you will observe increases in your stamina, your pleasure, and your ability to stay in the moment.

Even though I have practiced Taiji and meditation each morning for years, this extended morning preparation for the day and investment in integrated wellness enables me to maintain my equilibrium and release inner energy I didn't know I had. My five-day workweek ends Saturday evening. Saturdays are demanding with the need to be attentive to many customers. Often I don't get to eat lunch until late afternoon or even after closing. Being so drained on Saturday evening, I sometimes still feel dragged out on Sunday mornings, even after nine hours of sleep. My Sunday morning routine is to ride 10 miles to the Kriya Yoga Center for meditation. I ride the same route and know just how each hill feels and what gears I use. Some Sundays I'm pretty pooped and drop into my lowest gear for minor hills.

The first Sunday after taking a Qigong workshop with Ken Cohen, I instituted the above tranquil exercise routine. I had wakened that morning feeling low energy and sore. I knew I needed all the help I could get in order to enjoy my ride. About an hour after breakfast I set out on my bike. As I climbed the first hill about three miles into the ride, I was amazed at my stamina. No small chainring for me that morning! To my delight, my energy and focus remained high even as I completed my 20-mile loop. Here was tangible evidence of the transforming effects of cultivating and integrating my vital energy. My sleep and fuel were the same as many other Sundays, but the new ingredient was the extended

exercise to cleanse and open the flow of qi throughout my body.

I have been fortunate to have developed these component exercises over the last two decades and can draw on them for immediate results. If you are not practicing tranquil exercise now, begin with the Yoga, meditation, and acupressure described in this chapter and begin Qigong classes.

Conclusion

Western cultures have dissected, analyzed, and isolated each aspect of human nature. This has distracted us from integrating all parts of our lives. Fortunately we have opened our doors to the East and are benefiting from healing traditions that focus on maintaining health by balancing the body, emotions, intellect, and spirit. Combine these energy-centered wellness practices with the Western fitness and training techniques and you can design programs that will maintain balanced fitness and health and result in contentment in the midst of turmoil.

The physical and intangible parts of our nature respond similarly to caring maintenance. When we massage tight muscles, they may feel smooth and relaxed initially. As we continue to warm and stimulate them, the superficial surface muscles relax. After a few minutes, we gain access to the deeper tissue and can feel its true condition and loosen it up. The same sequence occurs when reflecting on our emotions. When we search for the causes of feeling glum, the first feelings to surface are related to recent events and superficial emotions. When we take time to embrace those emotions, accept them as our own, and release them, we can discover gradually the underlying causes of our current mood swing. When we observe these personal patterns regularly, we may be fortunate enough to correlate the tight muscles with the knotted emotions and work on releasing our retained tension by controlled breathing, stretching, acupressure, and reflection.

Increased awareness is essential to maintaining a healthy equilibrium. Using the techniques introduced in this chapter, you can begin a program of life-long wellness that will heighten your sensitivity to how you use your body and to imbalances in your mindbody, emotions, spirit, and social life. Effective breathing and quieting your mind are the first steps to heightened awareness. We react to the inevitable daily stresses and strains by becoming imbalanced. These specific fitness techniques are selected to help you develop an awareness of equilibrium rather than the more common approach of physically manipulating your body by force. Stretching, massage, acupressure, and Qigong open your body's natural lines of communication, helping you develop greater sensitivity and control essential to optimum fitness and health.

No matter what your circumstances or health inheritance, the choices resulting in abundant well-being are yours. Set your goals and use affirmations and visualization

to empower yourself to change. Work through difficult decisions with your family, employer, and friends so you are able to care for yourself. Everyone will benefit by your transformation. Recognizing that you are the only one who can substantially change your circumstances and improve your wellness will help you invest time and energy into caring for yourself.

Take time to reflect and experiment with the tools I have described in this chapter. You will be rewarded in proportion to the time and energy you invest. Begin with small steps in preventative maintenance. Then, when you recognize the first signs of health imbalance, take responsibility for regaining equilibrium by cutting down on non-essential expenditures of energy, adjust your food and drink intake, and pay more attention to your physical, mental, and emotional needs. Take control of your health maintenance and personal fitness and become a participant in your healing process.

low GI fruits is not intuitive. Notice that three dried fruits — apricots, raisins, and dates — are each in different categories. It will be worthwhile to purchase a reference book with a GI listing. I recommend *The New Glycemic Revolution*, because it includes the carbohydrate density for each food. Generally speaking, if you want to improve your nutrition you will need to eat more fruits and vegetables as well as more whole grains.

The term "whole grain" is misleading. Only 5 percent of grain foods in the U.S. diet are made from whole grains! Food coloring is commonly added to baked goods to give the appearance of whole grain. You will need to read ingredient labels. Wheat is the only grain that requires the label "whole." Oats, brown rice, barley, quinoa, and millet are whole grain without that designation. Select foods where whole wheat or another grain is the first ingredient listed. (*Tufts University Health and Nutrition Letter*, July 2002) Even so, not all bread with whole grain wheat as the first ingredient will have a low GI. Remember the physical form of a food strongly influences the GI. Whole wheat bread with a low GI must be dense and made of coarsely ground flour (stone-ground). This makes it even more essential that you bake for yourself or shop knowledgeably at health food stores.

Sample Glycemic Indexes of Common Foods

(Using glucose as the standard of 100)

Low G.I. Foods		Intermediate G.I. Foods		High G.I. Foods	
Fructose	20	Orange juice	53	Bagel	72
Grapefruit	25	Oatmeal cookie	55	Corn chips	72
Kidney beans	27	Basmati rice	58	Cheerios	74
Lentils	29	Sucrose	59	Jelly beans	80
Dried apricots	31	Pizza	61	Rice cakes	82
Whole milk	32	Granola bar	61	Pretzels	83
Yogurt with fruit	33	Banana	62	Baked potato	85
Ice cream	36	Raisins	64	French baguette	95
Apple	39	Stone wheat thins	67	Glucose	100
Pasta	41	Shredded wheat	67	Dates	103

Variations occur among brands and methods of preparation.

Use the GI values in full context and avoid "condemning" a food because it is high on the GI.

This means you will need to consider the **glycemic load** of each food. Foods not only vary in the speed of conversion from starch to sugar during digestion but also in the amount

Heat Index (Apparent Temperature)

Relative Humidity (%)

Air Temperature

F	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	95	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

With prolonged exposure and or physical activity

1. Extreme Danger	2. Danger	3. Extreme Caution	4. Caution
Heatstroke or sunstroke likely	Sunstroke, muscle cramps, and/or heat exhaustion likely	Sunstroke, muscle cramps, and/or heat exhaustion possible	Fatigue possible

This Heat Index Chart provides general guidelines for accessing the potential severity of heat stress. Individual reactions to heat will vary. It should be remembered that heat illness can occur at lower temperatures than indicated on the chart. In addition, studies indicate that susceptibility to heat illness tends to increase with age.

Reprinted from National Weather Service 1998.

Wind Chill Temperature Index

Temperature (˚F)

Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times **30 minutes** **10 minutes** **5 minutes**

Wind Chill (˚F) = 35.74 + 0.6215T - 35.75($V^{0.16}$) + 0.4275T($V^{0.16}$)
Where, T = Air Temperature (˚F) V = Wind Speed (mph) effective 11/01/01

The wind chill temperatures are based on:

- Wind Speed at an average height of five feet (typical height of an adult face) based on readings from the national height standard of 33 feet (typical height of an anemometer).
- The lower threshold of calm at 3 mph.
- The clear night sky It assumes no impact from the sun.
- Constant humidity.

Reprinted from the U.S. National Weather Service

accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. Clinical trials were conducted at the Defence and Civil Institute of Environmental Medicine in Toronto in conjunction with the Meteorological Services of Canada. The new values are not as extreme as the prior values calculated in 1945. It is interesting to me that the factors used in calculating the wind chill are temperature and wind speed but not humidity. This chart shows you that at 30 degrees with a wind of 20 mph, the wind chill temperature is 17 degrees. Be sure to dress accordingly. Now you can see the importance of measuring wind speed with an anemometer rather than guessing.