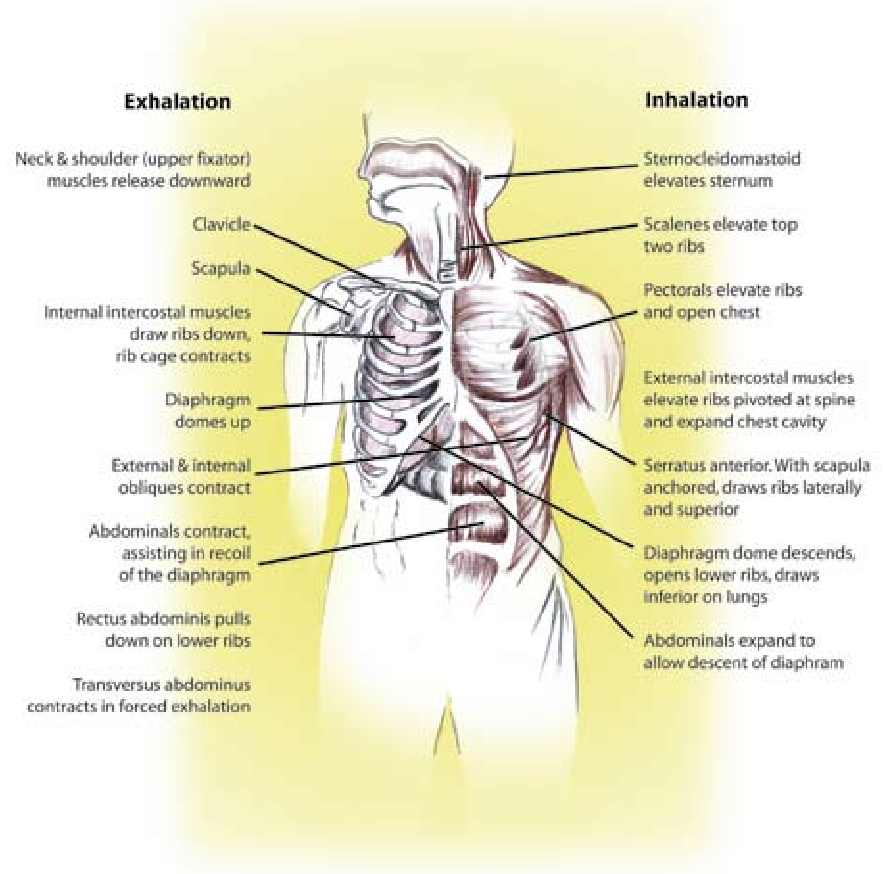
High Road to the Olympics

BY GEOFFREY BISHOP

Flagstaff, Arizona, sits atop the world, especially this year as we work our way nearer the 2008 Olympics in China. Many of the world's fastest athletes utilize the hypoxic conditions of this high altitude city to produce more red blood cells in which to carry oxygen to their muscles. They train long and hard, get sore, get up, and do it all over again the next morning. Erik Dalton's Myoskeletal Alignment is the therapy of choice for many training Olympians this year, and I'm honored to play a small part in their success.



Breath illustration adapted from Pat Conrad, by Victor Toehe. Printed with permission from Geoffrey Bishop.

With the only Olympic-sized pool in the country at the training altitude of 7,000 feet, both indoor and outdoor tracks, miles of great roads, single-track trails, and a huge lake, Flagstaff is buzzing with the world's anticipation of the Olympics. Northern Arizona will see about 500 elite endurance athletes and coaches from the world's stage in the calendar year leading up to the games. Triathletes come to train and typically do two or three medium to high intensity swim, bike, and run workouts a day. Runners come to train for middle and long distance events, from the 5 km to the marathon, some pounding the earth up to 140 miles a week. Our race walkers are a joy to watch for those therapists interested in gait analysis. Swimmers fill the pool, performing hard paddle-pulls to help endure the stress of hundreds of meters of training a week. All this elite training is done in the context of oxygen deprivation.

As you ascend from sea level, particularly to altitudes over 3,000 feet, the amount of oxygen carried by the hemoglobin in the blood is reduced, resulting in less oxygen being delivered to exercising muscles. As a result, athletes typically find themselves short of breath throughout their time at training camp. For swimmers, this feeling is compounded in the water; water provides an estimated 12 times the amount of resistance as air. Adding hydrostatic pressure, the effort used by assessory muscles in forced inspiration/expiration, to altitude while working out is enormous.

Imagine wrapping your thoracic cavity and abdomen in resistance tubing and doing your hardest workouts. It is not, at this point, just about absorption of oxygen within the soft spongy lung. Much of the focus of my work at this point is on educating athletes and improving their breathing. With the efforts put in by these athletes, staying ahead of the aches and pains associated with movement and breathing is the name of the game. The athletes cannot allow themselves to focus on the lack of efficient oxygen/nitrogen transfer during their initial training. They learn to ignore and conquer the discomfort that comes with each breath until the pain recedes slowly. When the headaches, diarrhea, and stomach cramps finally subside after a week or so of altitude training, the athletes begin to excel.

In the absence of proper manual therapy, the months athletes spend at altitude can seem much longer. Some camps can last for as long as three months, creating a dramatic energy drain. These folks need to be able to concentrate on their sport, not their body telling them there is something wrong with the biomechanics of their movement and activities. This year could be the realization of a lifelong dream, standing on the Olympic podium.

World-renowned distance running coach Jack Daniels always quips, "One of the biggest benefits of training at altitude is that you learn to hurt a little bit more." When the body ascends, the concentration of hemoglobin in the blood is reduced, resulting in less oxygen being delivered to working muscles. With a reduced amount of fuel to call on, an athlete has to work harder to achieve the same results, often recruiting other muscles to create movement. When an athlete takes that same workout back to sea level, the routine becomes that much easier.

Keeping in mind that the athletes are "hurting a little bit more," I try to stay ahead of their pain game. Oftentimes therapists are tempted to treat one area at a time—most often the area of chief complaint or pain. I do not believe it is possible to separate the result of our applied techniques in such a way. In fact, we may not even know we are working on the breathing apparatus when performing a latissimus lengthening technique on a swimmer. However, treating imbalances in long-lever muscles like the lats and serratus can create a positive affect on rib mobility and breath, when the intent is there (image 1). I honor therapists who do use these multifaceted techniques and I have witnessed many quality therapists who do understand this application. My time spent with these athletes is too important for random filler strokes and a lot of transitional work. It goes back to intent; "What do I intend to do here?" I try to get the most out of my time by multitasking and thinking about ambidexterity.

MYOSKELETAL ALIGNMENT AT HIGH ALTITUDE

Myoskeletal therapy not only addresses aberrant postural patterns, i.e., Janda's upper and lower crossed syndromes, but also has profound balancing effects between core stabililizers and the global muscles of movement. Although the theory remains the same, in the high country of Arizona many of the techniques have been altered to account for the unique needs of oxygen-deprived athletes.

THE ATHLETE'S SPINAL ENGINE

BY ERIK DALTON

Structural integrators and sports therapists are keenly attuned to the importance of cross-patterned walk where opposite arm and leg movement occur simultaneously. The traditional school of thought believes the legs propel the body with the trunk as its passive passenger—often defined as the pedestrian model of gait. However, many of us influenced by the early work of Robert Lovett, MD, and more recently, Serge Gracovetsky, PhD, have gone on to develop corrections based on the tenet that a rotational component (antigravity spiraling spring system) is essential to optimal movement and human performance.

Loss of reciprocal (coupled) motion between the pelvis and the lumbar spine during gait is one of the most common causes of low-back and hip pain. Gracovetsky's theory relies on this concept of coupled motion whereby lateral sidebending induces an axial torque that drives the pelvis. His theory suggests that cross-patterned arm/leg opposition is not generated by the legs but instead driven by a complex interaction taking place in the spine, core stabilizers, and global muscles of movement. To further buttress his position, Gracovetsky offers an impressive video showing a legless man walking with a perfect cross-patterned gait while balanced only on his ischial tuberosities.

WALKING VS. RUNNING

Observe competitive speed walkers and notice closely how downward motion of the trunk during right heel strike forces the spine to right sidebend. In this instance, contraction of the lumbar erector muscles are partly responsible for sidebending the spine as an energy pulse travels up the myofascial/skeletal kinetic chain from the foot's stirrup muscles (tibialis anterior and peroneus longus) through the biceps femoris, sacrotuberous ligament into the low back. Fryette's 1st Law of Spinal Biomechanics says *that in the presence of normal lumbar lordosis, sidebending and rotation occur to opposite sides*. Therefore, right sidebending of the lumbar spine left sidebends the sacrum, causing right pelvic rotation. This counter-rotation winds up the annular disc fibers and thoracolumbar fascia that stiffens the core. Upon release, a primary axial torque propels the left leg through the swing phase efficiently.

However, as the athlete transitions from walking to running, the power requirements of locomotion dramatically increase. As speed increases, so does interaction with the gravitational field. The core's power source (lumbar erectors, discs, etc.), unable to deliver the necessary propulsive force, must recruit help from global muscles such as the gluteus maximus and contralateral latissimus dorsi. Running causes greater hip extensor activation that lifts the entire trunk upward, causing quite a stretch between gluteus maximus and the contralateral latissimus dorsi. Why? Powerful cross-patterning action is inherent in the core's spinal engine.

Competitive runners often refer to certain running tracks as fast. Firmer surfaces and lightly cushioned shoes provide a stronger ground reaction force. The compressive pulse generated at heel strike is essential to the locomotion process if maximum energy is to be transferred from the Earth's gravitational field to the rotating pelvis. Any kinks along myoskeletal kinetic chains due to conditions such as spinal fusions, motion restricted joints, muscle contractures, etc., may alter firing order patterns leading to a block-like gait and compensatory kinks elsewhere along the chain. Evidence continues to mount that manual therapy in its various forms is a valid and indispensable method for enhancing peripheral mechanics.

Bottom line: optimal human performance relies on the optimal functioning of the spinal engine.

For more information, please visit www.erikdalton.com.

photos taken by Donna Shoemaker, ©Geoffrey Bishop.

While working with Team Timex Ironman athlete Jordan Rapp, flushing the latissimus and teres major after a hard swim, I shift my attention to the serratus anterior (assessory breathing muscle lifting ribs). Hooking the fascial slips and proteins of serratus anterior, I ask him to take a few deep respirations, achieving a powerful golgi tendon organ release, as I sweep posterior and medially. This has a positive effect on rib function while encouraging anchoring of the scapula in shoulder movement, thus in effect, reminding the origin of the origin.

Testing the firing order of neck flexion/release upper fixators. Initiation phase of head on neck flexion. As the athlete looks at his feet, the rectus capitus/coli should fire first, creating a chin tuck.

A notable substitution pattern of the head/neck flexion firing order will result in suboccipital and SCM firing first cocking the head back, potentially cramming the occipital-atlanto joint closed on one side or both.

Encourage the occiput to rotate anteriorly on the atlas. As the athlete contracts his longus capitus/longus coli to flex the head and neck, the therapist provides a light stretch to tight suboccipitals. The athlete pushes back into the therapist's resistance for a count of five seconds, relaxes, and the therapist repositions the athlete's head into anterior rotation. The therapist releases tight facilitated upper traps and levator scapula by asking the athlete to gently contract of the shoulders toward the ear, as the therapist resists movement of head into extension.

Commonly presenting with atypical breathing patterns, these elite athletes may be unaware of alterations of performance due to conditions such as scalene/diaphragm imbalances, rib/vertebral fixations, and spinal engine breakdown (See The Athlete's Spinal Engine, page 88).

UPPER CROSSED SYNDROME

An easy way to confirm the visual observation of a forward head posture is to test the firing order of neck flexion. With the athlete lying supine, I simply ask him to look at his feet. What we would like to see is the chin tuck first (image 2). If the eyes come anterior, toward the ceiling, before the head flexes on the neck, I assume he has an extensor dominant (ED) neck, tight, facilitated sternocleidomastoid (SCM), suboccipitals and scalenes, inhibiting longus capitus/longus coli, likely accompanied by tight facilitated levator scap and upper trapizius, pec major and minor. This is further confirmed by palpation of tissue texture abnormalities and pain generating guarding responses. In this common substitution pattern, SCM is working first to flex the head on neck (images 3 and 4). Coupling this ED neck pattern with upper chest breathing at altitude may prove to be inefficient at best. This pattern reduces space in the chest, as pectoralis major/minor gets involved, resulting in limited expansion of the thoracic basket and wasted energy, which would be better spent on activity.

ROTATION/INHALATION

Focusing on upper crossed syndrome, I talk to athletes about what I call rotation/inhalation restrictions. As we inhale, our humerus should naturally rotate externally. In sports such as swimming, cycling, and running, there are components of internal rotation or

HARD DAY'S NIGHT

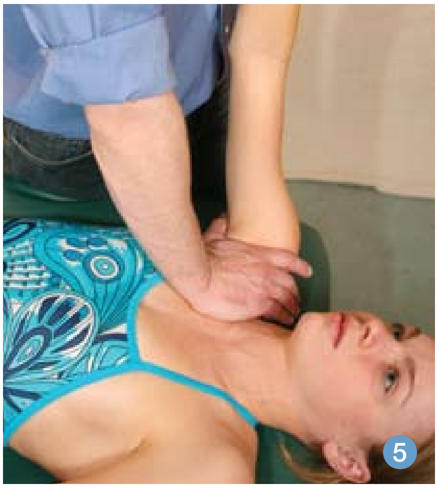
BY GEOFFREY BISHOP

Being one of the few certified Advanced Myoskeletal Alignment therapists (and an instructor) in Northern Arizona, my pain management practice has thrived with the addition of elite endurance athletes who move here to train. This really is a side job, lending to my full-time practice of working with corporate wellness, injury prevention, and long-time maintenance and chronic pain clients. To feed my passion for the work, my hours of operation often extend well into weekends and evenings six days a week.

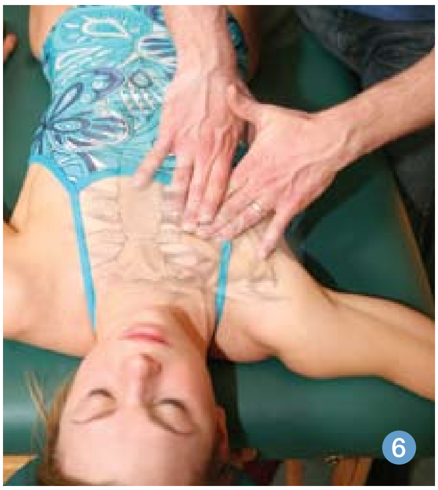
At the end of a long week I often joke about feeling a bit like the ultramarathon runners I work with: just trying to stay fresh for that final hour. Thriving on bottled water, energy bars, and an intense desire to help these amazing athletes become faster and faster, soon takes on a life of its own. Of course, having to leave home at the crack of dawn, missing family dinners, and returning just in time to tuck my three kids in bed has its own set of repercussions, but like the athletes' training routines, things should slow down a bit once our mutual goals have been met and the Olympic torch is lit on August 8. By the time you read this feature, I hope many hours of thoughtful preparation and execution will be paying off for the Olympic athletes.

arm adduction that cause a facilitatory reaction in pectoralis major and minor. Cyclists use this action as they lean far forward and hold their elbows in to limit wind resistance; swimmers as they rotate the upper extremity internally; and runners in arm swing. These activities can bind down the sternoclavicular joint, internally rotate the humerus, and again limit functional movement and space at the upper rib basket (images 5, 6, and 7). The goal in treatment at this point is treating sore, tired rotator cuffs, releasing facilitated pectorals, and bringing space into the anterior thoracic cavity. Once all the facilitated assessory muscles of breathing are addressed, the diaphragm and pelvic floor have

IN THE NOVEMBER/DECEMBER ISSUE OF *MASSAGE & BODYWORK* GEOFFREY BISHOP TAKES A CLOSER LOOK AT THE IMPORTANCE OF THE LUMBAR SPINE TO RESPIRATORY AND PELVIC DIAPHRAGM HEALTH.



Sternoclavicular joint. Therapist tests the clavicle's ability to slide posteriorly. With the athlete reaching toward ceiling, the therapist should feel the medial head of the clavicle move posterior on sternum. In the case of limited movement, the therapist applies pressure posterior to medial head of clavicle while drawing arm anterior, after athlete relaxes the reach effort. Repeat, alternating reach and pressure, until some degree of posterior movement is felt at the medial head of clavicle.



The therapist hooks his fingertips between ribs into intercostals and pectoral fascial slips, encouraging superior movement of the rib segment as the client inhales.

The therapist stands on the athlete's right side, facing headward. With the athlete's right arm abducted to 90°, palm facing the ceiling, the therapist initiates a facial hook gently at the clavicular head of pectoralis major. Asking the client to rotate the humerus externally, accompanied with an exaggerated inhalation, the therapist sweeps fascia laterally with hand, soft forearm, or fingers. Upon exhalation, the client is asked to internally rotate the humerus, as the therapist continues to sweep laterally. The therapist then relocates working hand or forearm to the pectoralis minor attachments at ribs 3-5 and repeats breath/rotation work. Repeat until a release is achieved, indicated by movement. (Note: caution should be taken to move breast tissue inferiorly with the hypothernar eminance, in an attempt to contact the musculature at ribs 3-5.)

the opportunity to activate more effectively, increasing room for breath.

A quick note on psoas tightness. Tight psoas muscles are identified by an accentuation of the lumbar spine and limited hip extension. This finding will likely be accompanied by an inhibition of gluteus maximus. This is a significant finding for two reasons; it points toward hyperlordodic conditions, not providing an optimal anchor for the diaphragm and pelvic floor; and, due to glute max inhibition, limits power in extension of gait. Stretching the psoas and facilitating the gluteus maximus is one of the best ways to help fast runners run faster.

There is no doubt that the athletes training here are going to be sore at the end of a training camp. This soreness *should* be from exertion however, not aberrant postures and muscle imbalances causing reoccurring injury. Dalton's Myoskeletal Alignment Techniques enable me, as a soft-tissue therapist, to identify and treat underlying strain patterns, muscle imbalances, and postural inefficiencies, allowing the athletes to concentrate on training their bodies to peak performance. **m&b**

Geoffrey Bishop is an Advanced Myoskeletal therapist and instructor with Erik Dalton's Freedom From Pain Institute. In Sedona, Arizona, Bishop instructs Myoskeletal Techniques as part of the core curriculum at Northern Arizona Massage Therapy Institute. He is CEO of Stay Tuned Therapeutics, a pain management and teaching clinic. He can be reached at staytunedaz@gmail.com.