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A different approach to leg-length discrepancies

By *LENNARD ZINN*

Very few people generate the same pedaling power with both legs. For some, the difference is dramatic, particularly if there is a measurable difference in the length of a rider's legs. We have noted, for example, that 1984 Olympic road race gold medallist Alexi Grewal suffers from a significant leg-length discrepancy due to an injury during his teens. Prior articles we have run on correcting leg length discrepancies using cleat shims, position adjustments and/or special cranks and pedals (VeloNews, May 8, 1995 and VeloNews, March 1993) triggered a steady stream of correspondence.

No one disputes that there are thousands of people walking around with leg-length differences of more than half-an-inch. The controversy usually focuses on how the discrepancy was caused and how best to deal with it. One school of thought believes that it is natural and predictable for a significant proportion of the population to have leg bones of different lengths. Thus, shoes and other sports equipment should be corrected to accommodate it. Others argue that a structure as precise as the human body, whose operation depends upon exact and repeatable reactions occurring on the scale of milliseconds, would not produce bone length discrepancies as large as half-an-inch or more, except in cases like Grewal's, where an injury was involved. They argue that corrections should be performed on the body and not the equipment.

Some leg-length discrepancies can be improved or corrected by chiropractic means. Riders using the chiropractic approach report mixed results, but one chiropractic specialty, "Upper Cervical Technique," practiced by a few chiropractors, appears to have a high and lasting success rate. The technique involves very precise measurement and correction of offset in the top vertebra of the spine.

Background

The top, or C1 vertebra (C is for "cervical," i.e., "neck") is also called the "atlas" vertebra. C1 is concave on top to accept the convex base of the skull, and it is convex on the bottom to fit into the concave top of the next vertebra. Central to the vertebrae runs the spinal cord, carrying body control messages from the brain. Between each pair of vertebrae are 31 pairs of nerves extending out to organs and muscles.



IT'S ALL IN YOUR HEAD
Proponents say proper alignment of the skull can correct many problems, including leg-length discrepancies.

Misaligned (or "subluxated") vertebrae can impinge on the nerves and hamper body function. Chiropractors apply force to parts of the spine with the intent of returning vertebrae to their normal positions. Cracking sounds usually accompany the adjustment. Upper Cervical Technique is distinct in that the adjustment is only performed on the C1 vertebra. The adjustment normally makes no sound. Furthermore, the direction of the application of force to perform the adjustment is not based simply on palpation (the chiropractors "feel") but rather on detailed analysis of X-rays. From the X-rays, a three-dimensional force vector is calculated and then applied to C1 to correct its position.

A misaligned atlas throws off leg length and distorts the entire body. The skull and the other vertebrae rotate and tip to compensate for rotation and tip in C1. The head weighs between 8 and 14 pounds. If it is not sitting straight on top of the spine, the muscles of the body must do something to counteract this bowling ball hanging off to the side. If the muscles on one side of the spine are tighter than those on the other, then the pelvis is pulled up on that side, thus "shortening" that leg.

I went to Farmington, New Mexico, a town of 40,000 near the four corners area, to view this procedure, as there are no practitioners of it within hundreds of miles of my Boulder, Colorado, home. Lloyd Pond, D.C., who practices with his son, Lonnie, is recognized among those who follow the subject as one of the leading practitioners of upper cervical technique.

Diagnostic Methods

The Ponds use a complex diagnostic machine with a digital printout called an "Anatometer" to quantify body distortion. It measures the degree of vertical pelvic tilt, pelvic rotation in a horizontal plane, the lean of the spinal column at the shoulder level, and the amount of weight the patient carries on each foot.

Patients first lie flat on a table to have leg length differences measured.

Patients said that they only feel a very slight pressure and the warmth of the hand on their neck. There was no deflection of the patient's head or neck during the procedure, nor was there an audible sound.

A heat-sensing probe is passed up the spine on the back of the neck. The probe has a temperature sensor on either side, of the spine hooked up to a machine that graphs the temperature readings as a function of position. The graph shows large surface-temperature variations on either side of the spine, indicating interrupted nerve supply.

The adjustment direction is based on X-rays, which one of the Ponds takes to ensure accuracy. Patient position and distance to the lens is precisely set in each

of three different X-ray angles.

On a light board, lines are drawn on the X-rays through a series of bone points. The precise relative angles of C1, the head, and the spine are measured in three planes. Once the exact misalignment of the atlas is determined, a vector direction in three dimensions is determined, precisely opposing the misalignment.

Adjustment procedure

The chiropractor applies a force directly along the determined vector direction to return the atlas to its proper position. The force must be applied with enough pressure to overcome the body's internal resistance to the adjustment without going too far.

The patient lies on his or her side on a low inclined bed with a head support. The adjustment is performed with the side of the heel of one hand on a corner of the C1 vertebra located just behind the patient's ear lobe. Lloyd or Lonnie Pond takes a number of measurements with the tape measure to determine where to stand and how to orient his sternum relative to the patient. A different position is used with every patient.

He clasps one hand about the wrist of the other hand, sets the heel of the lower hand on the bone and aligns his arms and the top of his sternum directly down the force vector determined from the X-ray. He does not push by straightening the arms, nor does he push by rocking his back or body forward. With either of those motions, the heel of the hand does not move along a line connecting the top of the sternum and the heel of the hand. Instead, the chiropractor locks his body in place, and the force comes from the shoulders by contracting the head of the triceps muscle. To call it subtle would be an understatement.

I observed the procedure being performed on a number of patients, and interviewed them before and after. They were long-term patients of the Ponds (some on the order of 15-20 years; Lloyd Pond has been doing this work in Farmington for 40 years). Several of the leg-length discrepancies were originally around an inch. Most patients were coming in for a semi-annual or annual checkup, although one had been involved in an automobile accident three days earlier.

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Afterward, the leg lengths were even, and the thermographs showed consistent temperatures on both sides of the spine.

Patients' comments

The patients reported feeling immediate relief. The reduced strain in the face of the auto accident victim was obvious.

Patients commented that while many joke about "having magic words said over them... half the people in town come to the Ponds." One woman, noted that Pond's rates have gone up from \$11 a visit when she first started seeing him 20 years ago to the current \$30 per visit but quickly added that she "would pay any amount for it" Patients told me of not only a reduction in the symptoms of body aches, but generally improved overall health.

Lloyd Pond claims only to correct the position of CI, and he acknowledges that it can improve overall health by improving delivery of nerve impulses and instructions from the brain, helping the body combat disease processes. Due to CI's close proximity to the brain stem, it simultaneously affects the brain and the entire spinal cord, and thus the entire body.

Lloyd Pond comments that his method is simply the application of physics to the human body. The adjustments can hold for years, unlike most chiropractic adjustments. After the initial series of treatments, visits are separated by many months, and Pond says if alignment is not off, "we don't touch 'em".

History

The practice of chiropractic medicine was established in 1895 by D. D. Palmer, who founded the Palmer College of Chiropractic in Davenport, Iowa. In the 1940s, the late John F. Grostic, D.C. and Ralph Gregory, D.C. developed the Grostic Technique of adjusting the atlas vertebra. The current upper cervical technique is an outgrowth of that approach. The National Upper Cervical Chiropractic Association was founded in 1966, and states, "if normal nerve supply cannot pass from the brain down through the brain stem and spinal cord, it is not logical to adjust lower vertebrae to restore nerve flow to individual nerve roots that cannot receive normal nerve supply."

When asked why less than 1 percent of chiropractors specialize in this technique, Lonnie Pond says that chiropractors are pulled in many different directions toward various chiropractic specialties, and, he added, "it is easier to crack backs."

John Dunn, D.C., a cyclist, and upper cervical chiropractor from Tallahassee, Florida, says that it takes a certain type of person to practice the technique. It is an exacting method and a real-life application of vector analysis, and therefore, attracts "the pocket-protractor types who drive used cars."

Dunn notes that the work-up is time consuming, the adjustment is sublime, and

the follow-up visits are less frequent so there isn't much motivation for a chiropractor to pursue the approach.

"It also takes balls to tickle someone behind the ear and tell them they are going to be just fine," joked Dunn.