Dynamic Chiropractic

ORTHOTICS & ORTHOPEADICS

Orthotics and Improved Balance in Elderly Patients

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Rather than seeking chiropractic care for relief of pain, the elderly more commonly appreciate adjustments because of the improved balance and coordination they achieve. There is a correlation between falls and the fear of falling in a large segment of the elderly population.[1] The fear of injury through a loss of balance is justified by the fact that each year between one third and one half of those age 65 years or over take a fall.[2] Not only do six percent of these falls result in fractures, but falling is also the leading cause of accidental death within the same age group.[3,4]

Balance requires specific coordination involving sensory and motor systems. Obviously these systems are susceptible to degenerative effects; however, it is important to remember that falling is not confined to the frail. It is common even among the most active elderly. In fact, it has been reported that 28 percent of older adults who exercise or walk daily will experience a fall in any given year.[5] Treating balance in the elderly will often require cooperation among several providers, but this article will highlight resources available to the chiropractor, especially the use of custom-made orthotics and footwear.

Environment	Physiologic	Pathologic	Drugs	Other
obstacles on floor	diminshed vision	arthritis orthostatic	antihypertensives	improper footwear
dim lighting	foot disorders	hypertension	sedatives	improper assistive devise usage

Table 1: *Risk factors for falling in an elderly population.*

Risk Factors

Table 1 contains some examples of risk factors to consider when treating the elderly for improved balance, or when counseling for the avoidance of traumatic falls. Without regard to the effects of aging or related complications, Dr. Ellen Davis Kelly highlights our inherent susceptibility to imbalance as follows:

"Posture is a distinct problem to humans because the skeleton is fundamentally unstable in the upright position. The two-legged human body presents a continuous problem in maintaining balance, a problem augmented because the feet are a very small base of support for a towering superstructure. And as though this were not problem enough, the trunk, head, and arms are supported from the hips upward by a one-legged arrangement of the spine."[6]

Postural Balance

As chiropractors, we are familiar with the many health advantages of balancing the spine. The goal

of custom-made, flexible orthotics is to maximize the support provided by the feet, creating a more stable foundation, which has also been proven to improve balance and proprioception.

Postural balance is a specific and specialized function involving proprioception, and it is achieved when the body's center of gravity is maintained over the base formed by the feet.[7] It may be interesting to review the relationships of proprioception, kinesthesia, and motor control. Proprioception is the summation of various input from mechanoreceptors found in joint capsules, ligaments, muscles, tendons, and skin.[8] Kinesthesia involves a conscious awareness of joint position and movement resulting from proprioceptive input, combined with afferent signals from the visual and vestibular systems.[9,10] Motor control coordinates an appropriate muscular response to the combined input, completing the feedback loop and providing a series of finely-tuned adjustments, leading to postural balance.

For the purpose of our discussion, it has been shown that injuries to the lower extremity, whether acute or from chronic deformation, can alter proprioception and diminish the motor response of balance.[7] The elderly are generally faced with cumulative trauma, combined with the degenerative conditions of ligament laxity, and decreased afferent input, in general. Therefore, new research that proves orthotics improve balance and proprioception is very encouraging.

Orthotics and Structural Support

Studies have shown that, although the loss of balance among the elderly occurs gradually and progressively over time, there are many methods for enhancing balance performance in the senior population.[11-14] In their research published in the *Journal of Manipulative and Physiological Therapeutics*, Drs. Stude and Brink showed that experienced golfers, after wearing custom-made, flexible orthotics daily for a period of six weeks, showed improvements in balance and proprioception.[15] This becomes significant, given the fact that experienced golfers would be expected to have maximized their coordination and balance abilities as it relates to the game of golf; and yet they did show improvement.

The results were obtained through functional tests involving single and double-leg stances, with and without the use of sight. Many seniors become overly dependent on their vision as proprioception decreases. The authors concluded that the dysfunction in balance ability observed (comparing right and left legs before and after orthotic use) decreased, and suggested that the use of orthotics promoted symmetrical balance ability and improved proprioception.[15]

Orthotics are made to address structural deficiencies, such as excessive pronation and arch integrity, in an attempt to minimize differences in structural alignment. Age has the tendency to accentuate structural deficiencies. Chiropractic adjustments of the spine improve proprioceptive input by normalizing joint alignment and muscle tonus. Furthermore, because the feet contain approximately one quarter of all the body's joints and, therefore, a concentration of proprioceptive fibers, it becomes logical to conclude that support of the postural foundation using custom-made orthotics will enhance the balance of our patients who need it most.

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