

iTrac™ - Scientific Background

The Mayo Clinic on Forward Head Posture

Correcting Forward Head Posture and restoring the cervical curve has significant potential to improve the quality of life for many pain sufferers. A 2008 article from the Mayo Clinic's Foundation for Medical Education & Research website states:

"Poor posture at work, such as leaning into your computer, and during hobbies, such as hunching over your workbench, are common causes of neck pain. Neck pain can result from several causes, including: Muscle strains. Overuse, such as too much time spent hunched over a steering wheel, often triggers muscle strains. Neck muscles, particularly those in the back of your neck, become fatigued and eventually strained. Most neck pain is associated with poor posture on top of age-related wear and tear. To help prevent neck pain, keep your head centered over your spine, so gravity works with your neck instead of against it."



In a 2000 article, the organization stated *"Forward Head Posture leads to long term muscle strain, disc herniations, arthritis and pinched nerves."* [27]

Research Links Forward Head Posture to Chronic Headache

In the mid 1960's, Dr. Murray M. Braaf, M.D., (then Attending Orthopedic Surgeon at Sydenham Hospital, Park West Hospital and the Headache Clinic, Stuyvesant Hospital, all of New York, N.Y.), along with his colleague, Dr. Samuel Rosner, M.D., F.I.C.S., (then of Rutgers University, School of Medicine), published work indicating a link between loss of normal cervical curve (Forward Head Posture), and chronic headaches:

- *"In chronic headache, definite, physical signs have been found consistently in the neck. Localized cervical tenderness, spasm of the muscles at the back of the neck, and restrictive movements of the neck are the most common physical findings ... especially pronounced during the headache phase. There is often loss of lordosis, narrowing of intervertebral spaces, osteophytic growths, and narrowing of intervertebral foramina, but at least loss of normal cervical curve is very consistent."* [23]
- *"Cervical traction is the most effective method, not only for giving symptomatic relief, but also for preventing the occurrence of headache on a permanent basis "* [24]



Assimilating the Braaf/Rosner Conclusions

Merging the above findings by Drs. Braaf and Rosner, one could conclude that utilizing traction to restore lordosis might well be consistent with additional reduction in headache occurrence. More recent research appears to validate this conclusion. The Department of Neurology, Nagoya University School of Medicine in Japan conducted studies of 372 patients with tension headaches in comparison to 225 normal control subjects. The studies were

published in 1992 and state in part: *“A great majority of the patients with tension-type headache were found also to have straightened cervical spine.”*^[25]

Headache & Loss of Neck Curve: An Unhealthy Pair

This data is supported by the conclusion statement of a study conducted by the Center for the Study of Spinal Health, Canadian Memorial Chiropractic College, Toronto, Ontario states: *“Both tension-type headache and common migraine subjects demonstrate high occurrences of: a) occipital and neck pain during headaches; b) tender points in the upper cervical region; c) greatly reduced or absent cervical curve; and d) X-ray evidence of joint dysfunction in the upper and lower cervical spine. These findings support the premise that the neck plays an important, but largely ignored role in the manifestation of adult benign headaches. A case-control study should be conducted to confirm the greater prevalence of cervicogenic dysfunction in headache as compared to non-headache subjects.”*^[26]



The Real Impact of Head and Neck Pain Conditions

- Approximately 200 million Americans exhibit Forward Head Posture.^[1]
- Americans spend \$2 billion annually on Over The Counter (OTC) medications for the treatment of headache.^[2]
- More than 45 million Americans suffer from chronic daily headaches (CDH).^[3]
- More than 28 million Americans suffer from migraine headaches.^[4]
- Migraine headaches affect 13% of the population, or 1 in every 4 American households.^[4]
- Seventy percent of all migraineurs are women.^[4]
- More than 20% of all young people in the United States experience chronic headaches.^[4]
- Women experienced twice as many migraines or severe headaches as men.^[5]
- The largest population affected by migraines or other severe headaches (18%) was in the 18-to-44 year-old of age group.^[5]

Headache Sufferers Seek Help

These affected patient groups often seek symptomatic relief from Physical Therapists, Orthopedic Physicians, Chiropractic Physicians, M.D.s, Doctors of Physical Therapy and other licensed healthcare professionals. Utilizing their own diagnostic skills, anatomical training, x-ray capabilities and the iTrac advanced software, these professionals are thoroughly equipped to accurately diagnose loss of cervical curvature. Historically, many such healthcare professionals have not had at their disposal the proper tools to restore health cervical curvature, even though they may have been keenly aware that their patient’s symptoms were likely a direct effect of Forward Head Posture (loss of normal cervical curvature). This need can be filled by the iTrac system with its advanced features.

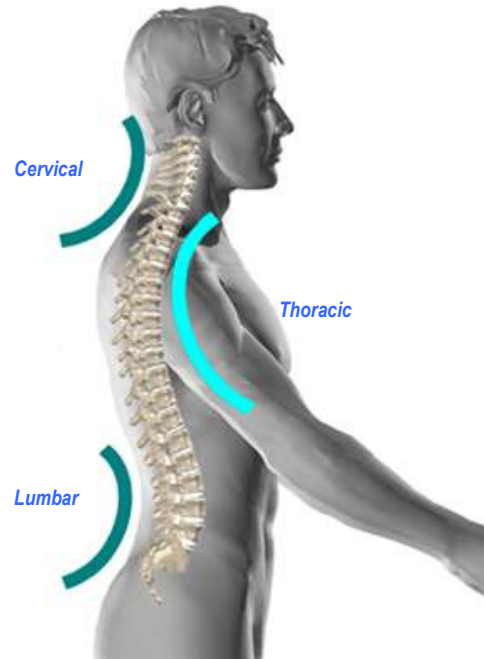


Support Material

The Spine & Healthy, Balanced Posture

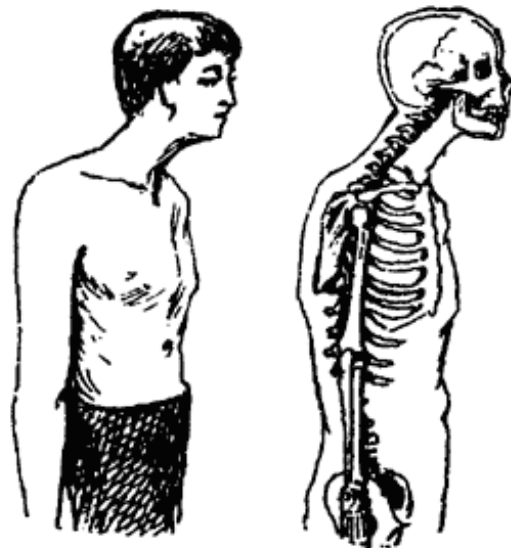
Since the mid-19th century, medical researchers have recognized and documented that the normal and healthy human spine is comprised of several curved regions.

- *“Viewed laterally, the vertebral column presents several curves, which correspond to the different regions of the column, and are called cervical, thoracic, lumbar, and pelvic.”* Reference: Henry Gray (1821–1865). *Anatomy of the Human Body* (Gray’s Anatomy)



- *“The vertebral bodies and supportive soft tissues of the neck and back need to be strong enough to support the head and keep the normal shape of the spine. “The muscles in the back must be able to resist the effect of gravity pulling the head forward. If there is damage to any of these areas, a kyphotic deformity can develop, and the weight of the head can cause reversal of the normal curvature of the spine.”* Reference:

<http://www.allaboutbackandneckpain.com> sponsored by DePuy Spine, a Johnson & Johnson company.





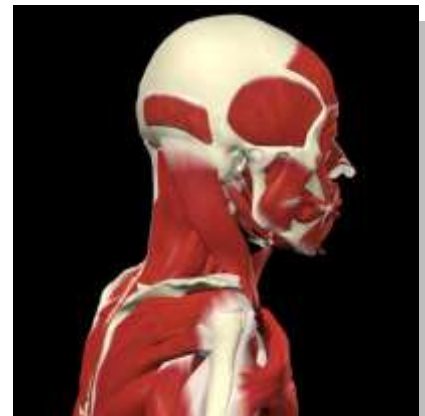
- The ideal spinal posture^[20, 21] places the center of gravity of the head directly over the point of the shoulder, the point of the hip and the at-rest center of the ankle.

- Just as the weight of a tower must be centered over its foundation for stability, so must the body be centered

and balanced to remain upright and relaxed simultaneously. These spinal curves are crucial in providing the flexibility, strength and cushioning necessary for a healthy, active lifestyle.



- While the cervical spine (neck region) has a vitally important role as it supports the head, it is also the least rugged of the 3 spinal regions. The neck is unique in its ability to rotate and flex significantly more than the other spinal regions. This characteristic is made possible by the anterior (front) and posterior (rear), complex groups of muscles, tendons and ligaments that surround the neck vertebra.



- The occupational demands of dental professionals, cosmetologists, elementary educators, administrative professionals and certain other professionals often require them to remain in a “head forward” position for many hours every working day.



- The technology revolution of the last 25 years has resulted in ever greater numbers of the population spending extensive amounts of time at computers and in other abnormal postural positions that create excessive stress on the posterior cervical muscles, tendons, ligaments and additional supportive soft tissues.



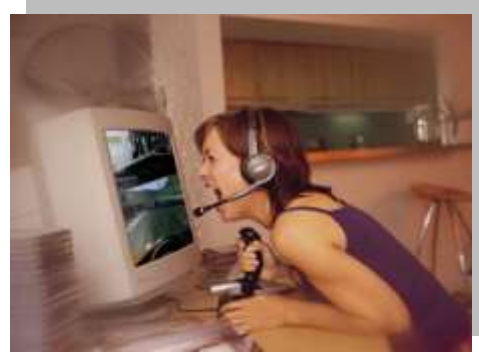
- Computer use has become an important part of life for many age groups and is increasing in the U.S. The following statistics are from the Pew Internet & American Life Project Tracking Survey, Feb. 3–March 1, 2004 and have a margin of error of $\pm 2\%$.
 - 24% of those over age 69 regularly use a computer
 - 57% of those ages 59 - 68 use computers
 - 76% of the ‘Leading Boomers’ (ages 50 – 58) use computers
 - 84% of the ‘Trailing Boomers’ (ages 40 – 49) use computers
 - 87% of the ‘Gen X’ers (ages 28 – 39) use computers
 - 85% of the ‘Generation Y’ (ages 18 – 27) use computers
 - According to this survey, over 90% of people living in households with incomes over \$50,000 are computer users

- Computer use alone is not the only contributing factor to the incidence of Forward Head Posture. The overall change in lifestyle during the last several decades may also play a significant role, especially in children and adolescents.
 - Today's young children may be replacing active physical play with virtual games and activities



- “**Screen time**” is a new term specifically created by the Bureau of Labor and Statistics to define a combination of computer use, television viewing and video game play.
- That agency’s American Time Use Survey (ATUS) for the 2003-2004 school months reveals the following estimates of time spent in selected activities for teens age 15 to 19.
 - Personal – 70 hours per week
 - School – 21 hours per week
 - **Screen time – 21 hours per week**
 - Paid Work – 7 hours per week
 - Homework - 5 hours per week
 - Playing sports – 5 hours per week
 - Housework – 4 hours per week

- These statistics indicate that the average teen is now likely to spend only 20 to 30% as much time in physical activity as they spend on their computer, playing video games and watching TV.



- *“At present rates, today's children will spend more than two years during their lifetimes on e-mail and more than 23 years on the Internet.”*

Alan Hedge, professor of Design and Environmental Analysis at Cornell and director of Cornell's Human Factors and Ergonomics Laboratory, speaking at National Ergonomics Conference, Anaheim, California, December, 2000

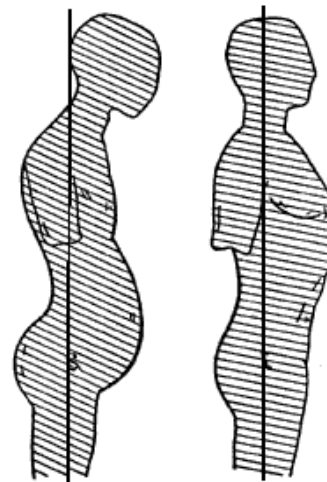


- *“Approximately 66 percent of the population (or more) have the condition of anterior head translation (Forward Head Posture) either with or without symptoms.”* Griegel-Morris P, et. al. Incidence of common postural abnormalities in the cervical, shoulder, and thoracic regions and their association with pain in two age groups of healthy subjects. Phys Ther 1992; 72:425-31
- *“Forward Head Posture leads to long term muscle strain, disc herniations, arthritis and pinched nerves.”* The Mayo Clinic, Nov. 3rd, 2000.
- In his book, ADVERSE MECHANICAL TENSION IN THE CENTRAL NERVOUS SYSTEM, Dr. Alf Breig, noted neurosurgeon and Nobel Prize recipient showed that as the cervical curve is lost, the tension of the meninges (covering of the brain and spinal cord) was increased in such a manner that measurable pressure was exerted on brain-stem nuclei (nerve control centers) which control our basic life functions. This in turn led to disregulation of basic metabolic control functions, and disease followed.

- A healthy cervical spine centers and balances the head much like a golf ball sitting on a tee.



- Our heads are similar in weight to a bowling ball (10-14 pounds), so as the head is carried forward of center (Forward Head Posture), the weight experienced by the muscles of the neck increases. The neck muscles of a person whose head weighs 10 pounds and has 2 inches of Forward Head Posture will experience a strain of approximately 30 pounds. *“Every inch of forward head posture can increase the weight of the head on the spine by an additional 10 pounds.”* Kapandji, Physiology of Joints, Vol 3.



- *“Forward head posture causes a host of systemic (body-wide) problems, but the 1st and main problem is with the neck and upper back. Research shows that this posture directly increases ligament strain, disk degeneration, muscle stretch and contraction, as well as deconditioning of the multifidus muscle which is the prime stabilizer of the disk and the facet joints in your spine.”* [28]
- *“Abnormal postures are well known to play a role in the causation of pain and functional impairment leading to disability.”* Calliet, R. M.D., Low Back Pain Syndrome, Edition 4, Pain Series, F.A. Davis Company Fourth Printing, 1991, pgs. 5-8 and 26-43.
- Calliet also states: *“Most attempts to correct posture are directed toward the spine shoulders and pelvis. All are important, but, the position of the head is the most important. The body follows the head. The entire body can be aligned by first aligning the head.”*

Neck Pain & Headaches

- *“In some industries, neck related disorders account for as much time off work as low back pain.”* Kvarnstrom S. Occurrence of musculoskeletal disorders in a manufacturing industry with special attention to occupational shoulder disorders. *Scand J Rehabil Med Suppl* 1983;8:1–114.
- *“Despite advances, migraines can be difficult to treat. About half of migraineurs stop seeking medical care for their headaches because they are dissatisfied with treatment results.”* Edward Lubin, MD, PhD, Head of Pain Management Center, Gessler Clinic; Consulting Staff, Department of Surgery, Winter Haven Hospital.

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31. CBP incremental addition of weight during treatment