Anatomical and Physiological Support Data For Posture Pump

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Aging and Degeneration

"Considerable evidence exists to support the point of view that **aging and degenerative changes are not synonymous** and that degenerative changes do not appear unless the joint has been damaged by trauma. Many elderly joints prove to be just as strong in torsion or compression as the younger ones. Furthermore, degenerated joints appear to be stiffer than normal but fail before the healthier ones. This is a typical mechanical characteristic of scar tissue and scar implies injury." (1. Harry Farfan, M.Sc., C.M., F.R.C.S., Managing Low Back Pain, Second Edition, © Churchill Livingstone Inc 1988, p25.)

Wolf's Law: "Established (1868). Every change in the form or function of a bone is followed by certain definite changes in its internal architecture and its external shape. Equal pressure to the epiphyseal plates results in symmetrical growth. **Asymmetrical pressure results in asymmetrical growth and vertebral deformity.**" (Modified from Cailliet, R.: Scoliosis: Diagnosis and Management. © F. A. Davies Company Fourth printing 1991,p5.)

Imbibition

"For years, osmosis was considered the basis for variable hydration of the disk matrix due to its colloidal state and its anion radicals. Further studies (Hendry 1958) have clearly shown that osmosis plays only a small role in the hydration of the matrix. **Most disk hydration occurs via imbibition.** If imbibition by the disc is a factor in its nutrition, it is mandatory that there is alternating compression and relaxation of the disk to ensure its: sponge imbibition action. Mechanically, this sponge-like imbibition ensures entry of fluid through the semipermeable membranes: the endplates of the vertebra and the outer annular envelopes of the disk." (Cailliet, R.M.D., Low Back Pain Syndrome, Edition 4, Pain Series © F.A. Davies Company Fourth printing 1991, p6-8.)

"The lumbar disc is a unique structure. **It is vascular only during infancy and in adult life it is dependant on diffusion of nutrients across the endplate.** This occurs most prominently during sleep. We are all shorter at the end of the day and taller in the morning when we awake. The relaxation of muscles and the decrease in loading creates a ***"bellows-like"*** **phenomenon,** which appears to enhance the diffusion of nutrients across the disc endplate. The reverse phenomenon has been demonstrated by dynamic high pressure intradiscal injection studies performed by my associate Dr. Charles Ray. He has shown that under increased pressure conditions intradiscal dye can directly pass through the intact endplate and enter into the adjacent system. The simple influence of acute changes in body positioning on loading has been demonstrated by Nachemson. He has shown that discal loading decreases by a factor of 5 from the standing to supine positions. I suggest that during episodes of ***discal decompression when nutrition is enhanced*** and discal volume increases this is also ***the phase when healing occurs.*** It seems to be logical to assume that the deposition of reparative collagen in the natural healing of annular tears and fissures would be enhanced under these conditions." (Kirkaldy-Willis, M.A.,M.D.,F.R.C.S.,(Edin),F.A.C.S., Managing Low Back Pain, Second Edition, Churchill Livingstone, 1988,p306-307.)

"The importance of close case management, early aggressive mobilization cannot be overemphasized. Bed rest and other passive treatments should be kept to the absolute minimum. Early protected mobilization of the injured body part, combined with a gradual, progressive increased in activities in a controlled, supervised

manner gives the best results." (Kirkaldy-Willis, M.A.,F.R.C.S. (Edin), F.A.C.S., Managing Low Back Pain, Second Edition, Churchill Livingstone, 1988, p305.)

Posture

"Abnormal postures are well known to play a role in the causation of pain and functional impairment leading to disability."

"Standard posture is defined by the posture Committee of the American Academy of Orthopedic Surgery (1947) as "Skeletal alignment refined as a relative arrangement of the parts of the body in a state of balance that protects the supporting structures of the body against injury or progressive deformity."

"All three curves, the cervical, thoracic, and lumbar, bisect the center of gravity and balance each other. These curves viewed in an erect position can be considered human posture. Studies have reveled that the erector spinae muscles are essentially inactive in the erect spinal posture, provided that the correct spinal curves exist. When the head moves ahead of the center of gravity the erector spinae muscles become active."

"It appears that effortless erect posture stance is accomplished by: Balance in the tonus of the spinal muscles which in turn creates balanced physiologic spinal curves."

"It can be summarized that posture in the correct erect static stance is effortless, thus non-fatiguing, and is pain free."

(Cailliet, R., M.D., Low Back Pain Syndrome, Edition 4, Pain Series, © F.A. Davies © Company Fourth printing, 1991, pgs 26-43.)

Axial traction

"The distraction produced by axial traction creates a favorable diffusion gradient tending to enhance disc nutrition across the endplate and thus promote the natural healing process" (Kirkaldy-Willis, M.A.,M.D., F.R.C.S. (Edin), F.A.C.S., Managing Low Back Pain, Second Edition, Churchill Livingstone, 1988, p 305.)

In this modern world even though axial spinal traction is routinely employed in physical therapy, chiropractic, osteopathy, and medicine, effective lumbar traction continues to be an elusive quarry. Lancourt pointed out in a resent review that lumbar traction is no better than a homeopathic remedy when used with the usual 15 to 30 pounds of weight and that 65 to 70 pounds of traction, not dissipated by friction, is required to influence meaningfully the lumbar spine." (Kirkaldy-Willis,