A New Dimension For Cervical Axial Decompression: Lordotic Support During Distraction

by Dr. Jay Kennedy

Cervical axial traction/decompression is an age-old therapy and its use could be described as ubiquitous. It is a staple in most physical therapy clinics and in perhaps 30 percent of chiropractic offices. Traction is typically understood as an axial procedure, that is, it imparts an accessory biomechanical action: Y-axis distraction (remodeling (mirror-image) traction can be applied in virtually any axis). Upon Y-axis distraction, inter-vertebral flexion also results. As will be discussed later, both flexion and extension may share the ability to decompress the spine. The addition of lordotic pressure during distraction however (extension at C4-C6) can impart additional benefits.

Axial traction's basic premise is to stretch or elongate the spine and create posterior vertebral separation, this separation having the potential to decompress the disc and of course widen the foramen, reducing compression on the neurological structures. Numerous studies confirm that in fact distraction has a "significant effect on the foraminal height and area" peaking from approximately 20 pounds of distraction. (*Quantitative changes in the cervical foramen resulting from axial traction*. Liu et al; *Spine* 2008).

Intuitively cervical compression and Spurling's test have the reverse effect — significantly diminishing the foramen height and shape. When compared to approximately 20 pounds of distraction, 14 pounds of compression significantly diminished the foramen size and shape. (*The influence of cervical traction, compression and Spurling test on cervical IVF*. Takasaki et al; *Spine* 2009.)

This influence is most apparent at C4-C6 levels, not coincidentally the levels most often implicated in serious neck conditions. Perhaps counter-intuitively (as with lumbar discs) many cervical discs show an extension directional preference.

So we can recognize that the spinal structures capable of causing (and sustaining) pain and disability can be directly affected by compression, distraction, and extension. In fact a positive Spurling/compression test was one of 5 predictive clinical rules deduced in a 2009 European Spine study to determine if axial traction therapy would be beneficial. The distraction test was also a predictive test. If compression of a disc and/or neurological structure can be determined with reasonable certainty

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then traction/decompression therapy should at least be considered as a viable option. Our clinical classification matrix intends to determine whether a compression or a disordered motion (not inherently compressive in nature) is the source of pain. It is also reasonable that if "compression" can be weaned from presenting signs and symptoms clinical "decompression" therapy is warranted. How it may benefit must be determined case by case; that it makes clinical sense to try is hard to argue with.

How distraction actually "works" remains relatively ineffable; however we can reasonably speculate that a physiological healing and/or pain gating are responsible for the relief many patients gain. Collagen cross-links may be allowed a greater opportunity to form during the centripetal effect. Renewed fluid and nutrient exchange are equally likely to account for the relief. A 2002 Japanese study (J *Orthop Sci*) suggested: "Traction therapy might improve conduction disturbances primarily by increasing the amount of blood flow from the nerve roots to the spinal parenchyma." There have been several studies showing significant benefit when traction is added to a multi-modal approach (*Phys Ther* 2010 May; 90(5):825). The 2008 BJD neck pain task force came to similar conclusions.

Several clinically valuable attributes of "how-to" apply traction can be gained from published studies. As to the force necessary to get the job done (and additionally "do no harm") it appears they suggest approximately 10 percent of the body-weight (TBW) should be sufficient. In fact two published trials concluded: "the 10% TBW traction group recorded the most significant pain relief and flexibility compared with either 7% or 15%. Additionally the least adverse reactions were in the 7% or 10% TBW traction group vs. the 15% TBW group." The 2008 Spine study also determined that approximately 20 pounds of distraction force created a peak of foraminal widening which was not enhanced by additional force. Other investigators have determined adverse effects have a linear correlation to added force. Most investigators seem to suggest approximately 10-12 percent TBW should be the force of choice for most applications. (Like many research findings this may or may not be in-line with your particular clinical findings). Many novice doctors believe more force must translate to better results. If the patient complains that they "just can't feel it" (always men, never women), the doctor often feels obliged to turn up the weight. It is simply faulty clinical logic. Start with the 10 percent rule and be very cautious in arbitrarily adding force — clinical outcome and complete patient tolerance must be the main determinants. Several sessions with modest force are simply more clinically relevant and valuable than one or two heavy sessions, and patients don't tend to run off.

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Osmosis (decompression) occurs at very limited distraction forces, this is an anatomical reality. Also studies have shown cervical distraction (especially at high force) can have untoward effects on cardiovascular variables (*Effects of cervical traction on CV variables*. Akinbo et al. Niger Med 2006 and *Blood Pressure and pulse changes assoc. with cervical traction* 2006). And if extensive degeneration and stenosis are apparent in the cervical spine excessive distraction can create "sciatic" symptoms. Like many things in life, less may be more.

Extension and hyper-extension however also have been shown to have a decompression effect on the discs as well. Various studies show that 10-20 minutes of a sustained spinal extended posture will recover overall height better than just prone posture (assumed to be from disc-height recovery). A 2009 *JMPT* study (Jun;32(5)) suggests: "extension and flexion postures were easily effective positions for the temporary recovery of spine height. These findings lay the foundation for research into the viscoelastic creep properties of the disc."

The question clinically is how can we use this information to enhance our cervical traction procedures? For one, adding a modest-to-moderate extension-pressure at the posterior region creates a fulcrum and may afford an advantage to the anterior migration-effect of the nucleus.

Combining both distraction with extension (lordotic support) may help tension the posterior ligament system to pressure the distended annulus anterior. The preferred embodiment would be a device with a variable inflation unit under the C4-C6 region; this could be doctor or patient controlled. This would afford the clinician the ability to enhance patient comfort and possibly reduce referral symptoms which persist during straight axial distraction. The combination of forces (dual-vectored force) can also have a greater effect on the pain gate by stretching the soft tissue in a novel way (and the concomitant use of heat or ice during the traction may further enhance the benefit as well). Innovations to tried and true therapies add new potential for those well-healed in their use, and an added benefit for new practitioners investigating the therapy for the first time.

About The Author — Dr. Kennedy has developed, tested and taught a highly effective, easy-to-learn chiropractic decompression therapy technique.