

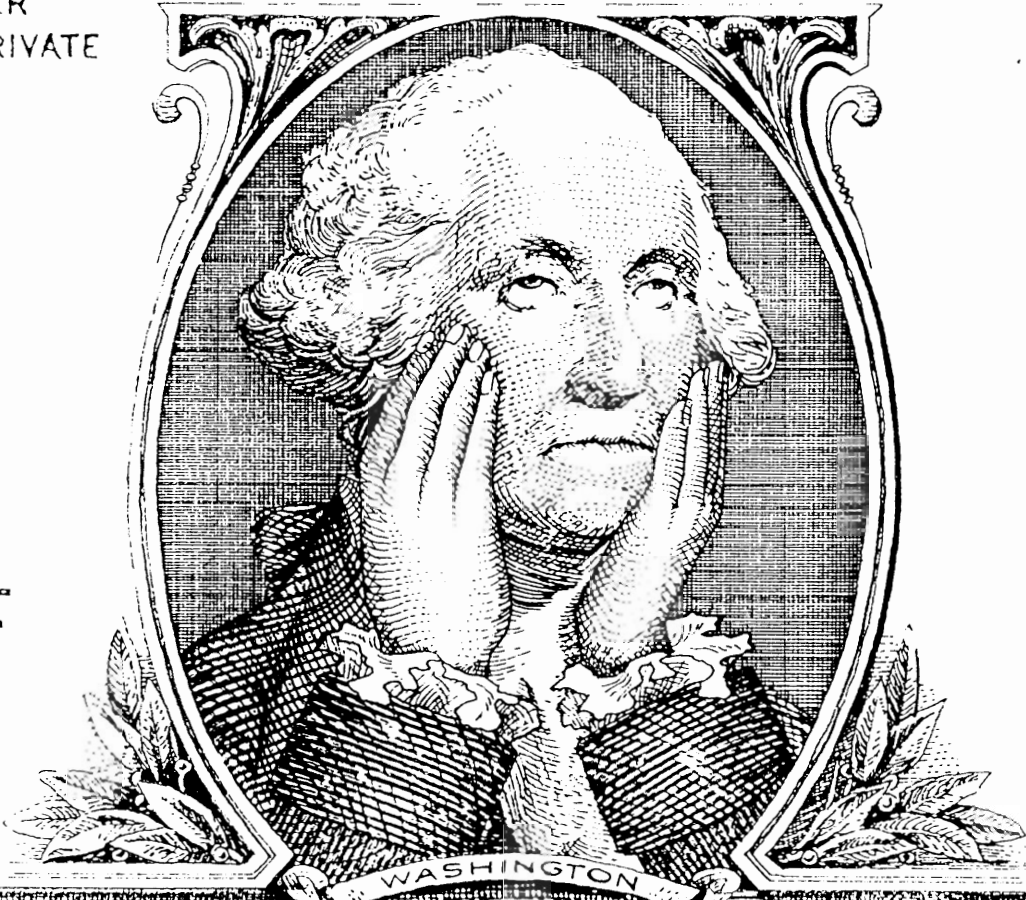
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## The Role of Spinal Inverted Traction in Chiropractic Practice

By James P. Meschino, D.C.

*The following clinical study by James P. Meschino, D.C., a practicing chiropractor and research associate of the Canadian Memorial Chiropractic College, was conducted in connection with the Inverchair, a new inversion-traction modality that was introduced in selected markets in Canada and the United States in September, 1982.*

*While this study has been presented in Canada, it is offered exclusively to the ACA Journal for its readers in the United States.*

"Low back pain is the third most common reason for a patient to seek medical help (after emotional-psychiatric needs and headaches). Back pain is our greatest burden from the purely economic standpoint of loss of worker productivity and of inefficiently applied medical resources leading to an inordinately high liability to the health-care system as a whole."<sup>8</sup>

"As a cause of temporary disability, under the age of 45, back disorder has been identified as the most frequent cause and, in the 45 to 65 group, it ranks third after heart disease and arthritis. Sattie's statistics suggests that back pain

accounts for 10 to 15 percent of all lost work days. The economic significance then is that one percent of all work days are believed to be lost due to back pain."<sup>2</sup>

This brief epidemiological review highlights the statistical importance of low back pain problems as encountered in clinical practice.

The vast majority of these cases present themselves with non-operable spinal lesions. Conservative management of these cases remains the more popular treatment of choice. Under this heading are included: (1) exercise therapy; (2) manipulation; (3) traction; (4) bracing; (5) local injections; (6) TNS; (7) chemonucleolysis; (8) systemic medication, and traction therapy.<sup>2</sup>

The following discussion concerns itself with the overall benefits of spinal traction as an adjunct to chiropractic adjustment. The type of traction of particular interest to us is that of spinal inverted traction.

Investigation into spinal inverted traction and chiropractic adjustment has been instituted into a chiropractic practice at Toronto's Columbus Centre. In this instance spinal inversion was performed in an Inverchair (Trademark Registered). This treatment modality is a preferred traction apparatus for the following reasons:

(A) The hips and knees rest in a flexed position throughout the treatment session. This position is favourable because it flattens the lumbar lordosis thereby optimiz-

ing axial traction forces acting through the lumbar region.

(B) This position also promotes relaxation of the vertebral portion of the psoas muscle which is found to act as a loading force on the lumbar spine even when the patient is supine with hips and knees extended.

Therefore, hip and knee flexion facilitates lumbar traction by improving axial vector forces of traction through the low back and by decreasing the loading effect of the psoas muscle on the lumbar spine while traction is being performed.

(C) An added feature of this modality is that the angle of inversion can be controlled and precisely recorded. This is in contrast to other popular forms of inversion which do not have intermediary stages of inversion but seem to operate on the all or none principle. This point is of considerable importance when dealing with the acute patient or with the patient who demonstrates a borderline contraindication. A therapeutic trial of increasing degrees of inversion may be attempted without completely inverting the patient to full inversion.

(D) Many other conventional traction devices place harnesses around the patient's chest and then traction in a caudal direction with a second lower attachment while the patient lies supine on a traction table. The harnessing of the chest presents special problems to almost all of those with cardiorespiratory complaints. It has been demonstrated that the Inverchair

has fewer contraindications with respect to these problems as the chest area is not in any way confined.

(E) The safe and simple operation of the Inverchair as a traction device allows the patient to be able to give him or herself an inversion session, obviating the need for the practitioner or therapist to operate the controls.

Prior to entering into a detailed discussion as to the current state of knowledge involving traction and inverted traction therapies, let us remind ourselves that the combined usage of manipulation and traction is not a new concept. In fact, Cyriax, in his *Textbook of Orthopaedic Medicine* (Volume One), *Diagnosis of Soft Tissue Lesions*, provides graphic illustration of manipulation during traction, traction tables and an inverted hanging apparatus to correct spinal dislocations, dating back to Hippocrates. We learn that the concept of spinal inversion dates back to at least Ninth Century Greece.

In recent years much evidence as to the beneficial effects of spinal traction has been documented.

From research gathered at "The Sister Kenny Institute Gravity Lumbar Reduction Therapy Program" Burton comments, "Axial traction has been long recognized as an effective means of reducing improperly aligned or displaced vertebral elements as well as their associated intervertebral discs and soft tissues."<sup>8</sup>

Application of tractional techniques at this centre have measured good results with lumbar disc herniation (protrusion), lumbosacral strain and early scoliosis cases. Even in cases of lateral spinal stenosis, some decompressive surgeries have been avoided.

Dynamic studies by Raney have documented that vertebral separation through the mechanism of pulling the longitudinal ligaments taut, can reduce disc protrusions as seen in full-column myelograms on

living subjects. These results were also obtained by use of axial traction applied to the lumbar spine.

In reference to disc protrusion, spinal traction with the lumbar spine flattened will promote distraction of the posterior elements of the lumbar spine, reducing tensile stress on the annulus fibrosis and widening the IVF apertures at the lower two interspaces.<sup>8</sup>

Cyriax, an orthopedist known to combine traction and manipulation to designated spinal disorders, cites several conditions where traction should be applied: soft nuclear protrusions of both the postero-central and postero-lateral type, bilateral long-standing limitation of a straight leg raise and bone to bone lesions (kyphosis, scoliosis etc.).<sup>5</sup>

In his estimation the benefits of traction are obtained by:

(1) Suction — A sub-atmospheric pressure is induced when the bones move apart, with centripetal effect on the contents.

(2) Distraction — The increase in distance between the articular edges may disengage a protrusion that was too large to shift during mere avoidance of compression during recumbency. X-rays have shown an increase in width of the joint of 2.5 mm.

(3) Ligamentous tautening — Movement apart of the vertebrae tautens the PLL, which then exerts centripetal force on a central protrusion.

Of note here is the fact that Cyriax recommends continuous traction which fatigues the muscles. It takes three minutes for electromyographic silence to be attained after traction begins, hence pulls of shorter duration merely elicit the stretch reflex and exercise the sacrospinalis muscles without distracting the joint surfaces.

In keeping with this rule of sustained traction, Inverchair is a continuous traction device which allows patients to build up their

tolerance level to a three minute inversion treatment usually in only a couple of sessions. This, of course, is favored over any device utilizing intermittent traction properties.

Frankel and Nardin commenting on loads applied to the lumbar spine summarize that in the supine position with straight legs, some loads on the lumbar spine are produced by the pull of the vertebral portion of the psoas muscle. With hips and knees bent and supported, the lumbar lordosis straightens out, the psoas muscle relaxes, thereby decreasing the load on the lumbar spine. A further decrease in the loads is achieved by applying traction.<sup>9</sup>

In a study measuring the direct relationship of spinal inverted traction with objective examination, Nosse concluded that inverted positioning increases the spinal length and reduces the emg activity of lumbar area musculature in healthy male subjects. A minimum duration of 70 seconds was required for the maximal effect of the inverted position on the lumbar musculature. Both changes were statistically significant.<sup>19</sup>

In a study of patient's presenting with discogenic sciatica, Gray combined a treatment course of manipulation and body-weight traction on a polished inclined plane. Of 14 cases in which there were no signs of neurological abnormality, traction was successful in nine of those effectively treated; no definitive treatment other than traction was required in four cases; in four, improvement occurred with traction, and recovery followed the addition of manipulation; in one case, mild low back pain was accepted as a satisfactory outcome of traction. Of 26 cases in which there were signs of neurological abnormality, traction failed in nine. It gave effective relief variable in degree in 17 cases.<sup>11</sup>

Gray also reported that radiographic proof of a significant de-

gree of distraction of the lumbar disc spaces was evidenced by use of an inverted body traction board.<sup>10</sup>

In a study conducted at Toronto's Orthopaedic and Arthritic Hospital, Bateman et al. studied 50 cases over a period of six months. These patients had a variety of low-back conditions and were given Inverchair treatment. The results of the study indicated that 35 of these patients were either improved or cured by the application of Inverchair traction. These cases included, lumbosacral instability, lumbosacral sprain, post lumbosacral fusion, lumbar osteitis, and sacro-iliac irritation.<sup>2</sup>

Bateman is the first to indicate patient exclusions as to the use of Inverchair. This list is worthy of comment and includes: coronary disease, arteriosclerosis, middle ear disease, motion sickness, dizziness

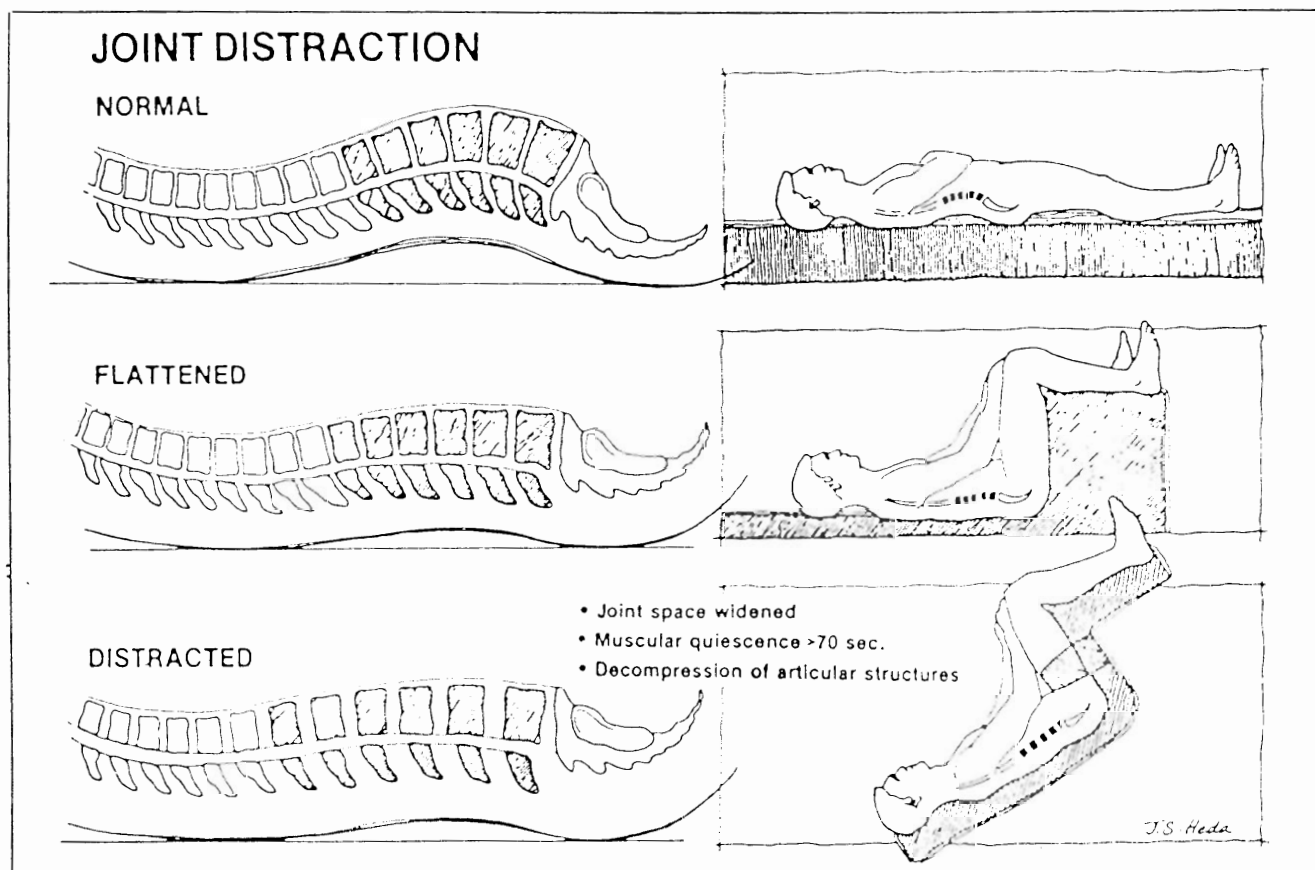
and vertigo, hiatus hernia, and inguinal hernia. In addition to these established physical contraindications, consideration as to the patient's age and general musculoskeletal stability should be used routinely.

Bateman concludes however, that application of inversion traction can be carried out with safety and without significant systemic upset or undue reaction. The modality lends itself to application of a broad range of cases and has the particular efficacious effect of ease of application, simplicity of control and strongly indicates that it is a possible domiciliary method of materially helping "normal" sedentary or activity-related lumbosacral back discomfort.

Let us now consider the adjunctive role that Inverchair traction may play within the scope of the chiropractic profession. Since its

inception chiropractic has maintained that the relationship between structure and function of the body was of crucial importance. The spinal column, as a covering for the prolongation of the brain (spinal cord), functions as to afford exit of nerve radicals through the IVF, which then terminate in tissues that they innervate.

Chiropractic recognizes that any static or dynamic biomechanical fault of spinal articulations may serve as an irritant to structure-function relationships and as pointed out by Burton<sup>4</sup> in his article "Conservative management of low back pain" (Vol. 70/No. 5 Nov./81 *Post Graduate Medicine*), with respect to the lumbar spine normally loading is evenly distributed across the lumbar spine and each structural element is subjected to equal stress. When loading is unevenly distributed, some elements are



subjected to such high stress that they deteriorate rapidly and lose their structural integrity. Abnormal spinal stress may originate early in life with congenital anomalies or asymmetries of development or acquired injuries or insults. Stress is enhanced by acquired musculo-ligamentous injuries, which decrease stability and produce mechanical abnormalities. The resultant loss of stability allows progressive abnormal movement of, and stress, of facet joints, producing typical "mechanical" low back pain and progressive subperiosteal bone deposition, leading to formation of osteophytes and enlargement of the facet joints themselves.

As clinicians we should bear in mind that there are two major physical forces that act on the spinal column: Gravity acts as an extrinsic force and this force varies according to postural position (i.e. sitting exceeds supine position). Intrinsically, the muscular system acts as a second dynamic force.

Bateman, Cyriax, Burton et al. indicate that maintenance of certain types of chronic-recurrent lumbosacral conditions can be stabilized through the use of periodically applied traction. In the study that follows, supporting evidence as to the maintenance of chiropractic patients by the combined use of manipulation and Inverchair traction in chronic-recurrent low back complaints reveals that spinal inverted traction was an invaluable adjunct in the stabilization of these cases.

As chiropractors interested in the prevention of subluxations or vertebral dyskinesia, it is of interest to us to negate gravitational compressive forces and allow a return to relaxation of the sacrospinalis musculature. Inverted traction, by reversing gravitational forces affords the spine relief of extrinsic compressive forces and would seem by Burton's estimation to reduce improperly aligned or displaced vertebral elements. As indicated earlier, if we sustain traction through the lumbar spine for three

minutes or as Nosse points out, possible for only 70 seconds, relaxation of lumbar musculature occurs.

This effect of negating the two major physical forces acting through the spine (gravity, muscular) indicates that inverted spinal traction plays a promising role in the prevention of spinal stress, as it relates to the practice of chiropractic . . . Prevention.

Improvement in biomechanics and orthopedic testing was consistently witnessed after inversion was introduced to this population. Pain reduction and maintained pain reduction were most remarkable.

Certain spinal inversion is of great benefit in the long term management of chronic-recurrent chiropractic cases, as a maintenance procedure . . . Maintenance.

As mentioned by all previous researchers and reporters, body weight traction is of importance in the initial therapeutic management of a variety of lumbosacral disorders i.e. (disc protrusion, lumbosacral strain, early scoliosis, sacroiliac irritation etc.) . . . Therapeutics.

One final note must include that it has not been the author's intention to disparage the importance of chiropractic manipulation or adjustment. However, it would seem that any ancillary technique that would effectively produce joint distraction and promote muscle relaxation of the lumbosacral area would allow a more permanently based correction to be accomplished through manipulative intervention. As an extension of chiropractic management spinal inversion seems to resonate on all three levels of chiropractic spinal involvement: 1. Prevention and Conditioning; 2. Maintenance; 3. Therapeutics.

The following study was done at Toronto's Columbus Centre under the supervision of James P. Meschino, D.C. Inverchair was introduced into a chiropractic practice for a period of three months.

As a therapeutic trial, patients with chronic-recurrent low back cases were given Inverchair traction to determine if objective improvement in orthopedic and biomechanical testing would be evidenced.

Presently, a 12-month study has been undertaken at the Canadian Memorial Chiropractic College.

Further scientific parameters and new clinical dimensions for the use of Inverchair traction are being explored. ■

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# The Treatment of Low Back Pain by Combined Inverted Spinal Traction and Chiropractic Manipulation

By James P. Meschino, D.C.

This study measured the degree to which spinal inversion therapy could serve as an adjunct to chiropractic manipulative management of low back conditions. The total patient population numbered 24. All of these were chiropractic pa-

tients and were specifically selected according to the nature of their low back disorders. The objectives of the study were the following:

1. That inversion therapy had a desirable effect upon relieving pain in the low back region;

2. That inversion therapy could improve biomechanical function of the lumbo-pelvic region and obtain improvement in objective ortho-

pedic testing; namely, a Lasegue Test (passive performance of straight leg raise);

3. That inversion therapy enhances the effects of chiropractic manipulation and encourages longer-lasting relief of pain, improved biomechanics and corrected orthopedic signs in patients suffering from a variety of chronic-recurrent low back pain conditions.