Spinal Health As It Relates To a Common Gate

The spinal column in humans is composed of seven cervical vertebras on top of twelve thoracic vertebrae that rest on five lumbar vertebrae, which rest on the sacrum that is composed of five fused segments.

Each spinal joint articulates with the vertebra above, primarily through what's called a three-joint complex consisting of two facet joints and intervertebral disc. Vertebrae are held together by ligaments and the intervertebral discs. The individual vertebrae are moved in a coupled fashion of tilt and rotation by the coordinated efforts of spinal muscles. The spinal joints have ideal motions that each individual joint should perform. Specific muscles are engaged in the process of moving a vertebra in a particular direction.

The spinal join complex may be compared to a common gate. When looking at a common gate, there is the gate post to which the gate is attached with hinges. When comparing the gate to the spine, the post and side of the gate would be consistent with the adjacent vertebra. The hinge on that gate would be analogous to the attachment of joint surfaces. The hinge component with the associated hinge screws are similar to the ligaments which would be binding the spinal joint complex. An individual providing the physical power to open and close the gate through its range would be analogous to the muscles working around the joint.

A strong person that opened and closed the gate would add through their muscles stability in moving the gate. This assistance on the gate would reduce the stress on the hinges by their physical assisting of the movement of the gate. If that gate was not opened or closed through its full range those aspects of the hinge associated with the extremes of motion would be less used and in the case of an iron gate, rust would form to restrict the full movement of the gate through the unused areas. Also, if the individual lacked strength, as they moved the gate, more of the weight would rest on the hinges to add to the wear and tear of the hinges and screw attachments.

Spinal joints have specific motions just as the gate. If the spine is not moved through its full range due to weak muscle movers, more load is placed upon the ligamentous structures. This causes increased joint stress, wear and tear. That produces faster rates of deterioration. If a joint isn't moved through its full range, there's a decrease in feedback from the movement receptors around the joint along with a decrease in the use of the surface of the joint. The brain would be less activated. As with the hinge, when it rusts, the spinal articulations would gradually build up precipitants of calcified salt infiltrates producing roughened joint surface endplates and cartilage deterioration. The joint destruction would result in degenerative joint disease with further restrictions of motion.

By increasing the strength of the paraspinal muscles more smooth integrative motion occurs with less stress on the joints and more brain activation from the stimulation of movement receptors. Adding specific adjustments would increase the range of motion of the spinal joints to further increase the feedback through mechanoreceptor populations for better joint control. This would also move that joint through a broader joint motion pattern. The increased motion would assist in reducing the degenerative changes.

An understanding of this mechanism of spinal movement is a change from the idea that joints are either in place or out of place. The understanding of the importance of having a particular joint brought back into its appropriate range of motion adds to the value of chiropractic care to spine and nervous system health.

Research confirms that joint motions are best restored with specific spinal adjustments paired with therapeutic exercises. Using the **combination of spinal adjustments for motion and therapeutic exercise for maintaining the strength of the joints has been proven to be the most effective method for healing spines with motion problems.**

The half life of muscle protein is six to ten days. So, if a joint has lost a motion pattern for six to ten days, fifty percent of the contractile capacity of that muscle is lost. That spinal weakness, associated with the muscle loss, makes the spine vulnerable to injury. When that joint is required in the performance of spinal motion or stabilization and the muscles are no longer adequate for the task, joint failure causes a back sprain. Whereas in the case of the gate, if the gate over time is not used and suddenly needed to be moved, a potential for damaging of the hinges or ripping the hinges loose from the gate would be similar to the experience of a joint sprain.

For this reason, doctors of Chiropractic and the literature indicate that specific adjustments restore the individual motions of the joints and therapeutic exercises are most beneficial for building and maintaining the muscles of the spine to prevent injuries. **Adjustments for motion and exercise for strength increases capacity for a happier and healthier life**.

The following reference support specific adjustments of motion in combination with exercises as the most effective methods for care:

A 10-week study investigated the benefit of manipulative therapy and stay-active care vs. stay-active care alone in 160 patients with LBP of three months or less duration. The authors defined “stay-active” as an approach to patient care whereby patients are encouraged to take part in physical and other activities to stay fit.

Results showed that manipulation combined with stay-active care “improved pain measured as pain during the last week and everyday function in acute and subacute cases of low back pain better than stay active treatment only.” Moreover, at 5 and 10 weeks, patients in the experimental group had less pain and lower disability rating indices than members of the reference group.

In addition to treating LBP, regular chiropractic care has a host of other benefits, including pain and stress relief, while regular exercise is necessary for maintaining total health and wellness. Imagine what the two combined can do for your health and well being. Now is the time to take action, and take responsibility for your motion, appearance, and state of wellness.[1]

For references supporting the benefits of chiropractic care for chronic neck and low back difficulties, see the following:

[1] Grunnesjö MI, Bogefeldt JP, Svärdsudd KF, Blomberg SIE. A randomized controlled clinical trial of stay-active care versus manual therapy in addition to stay-active care: functional variables and pain. *Journal of Manipulative and Physiological Therapeutics*. September 2004; 27 (7): 431-41.

Active range of motion in the cervical spine increases after spinal manipulation (toggle recoil).

In discussing this study the author Nilsson, D.C., M.D., Ph.D., from the Department of Sports Science and Clinical Biomechanics at the University of Southern Denmark said, AIt is the fact that our range of motion study deals with the physiological variable exclusively (in contrast symptoms, feelings, perceptions, etc.) that makes it so important. Chiropractors are often accused of talking their patient=s well, suggesting that spinal manipulative therapy does not have any physiological effects on objective body function. This paper pulls the plug on that reasoning.@

Furthermore, in reviewing this particular study, Anthony Rosner, Ph.D., Director of Research for the foundation of Chiropractic Education and Research indicated, AIncreased ranges of motion have been reported to accompany spinal manipulation....establishing increased ranges of motion confirms the biomechanical effect that previously has been presumed to accompany spinal manipulation...this study is significant and offers an important clue to more fully understanding and appreciating the consequences of spinal manipulation.@[2]

Effective cervical spinal adjustments on lumbar paraspinal muscle tone, evidence for facilitation of intersegmental tonic neck reflexes.

The conclusion of Dr. Nansel ,Waldorf, and Cooperstein=s study indicated that, AResults indicate that cervical spine manipulation can have significant effects on the tone of the lumbopelvic musculature, presumably by facilitating tonic neck reflexes involving intersegmental spinal pathways.@[3]

Magnetic Resonance Imaging and clinical follow up study: study of 27- patients receiving chiropractic care for cervical and lumbar disc herniations.

Dr. Eliyahu=s conclusions were: AThis perspective case series suggests that chiropractic care may be a safe and helpful modality for the treatment of cervical and lumbar disc herniations.@[4]

Cervical radiculopathy diagnosis and treatment of pathomechanics of the cervical spine.

Dr. Frederick and Carrick=s study concluded: ADeviations from the normal coupling mechanism in the cervical spine were directly related to the level of clinical radiculopathy. Aberrancies in the coupling mechanism of the cervical motion segments were reduced by manipulation, and post manipulative reduction examination revealed improvements in sensation, motor power, and deep tender reflexes, as

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2 Wittingham W, Nilssonn. AActive range of motion in the cervical spine increases after spinal manipulation (toggle recoil).@ Journal of Manipulative and Physiological Therapeutics, Nov-Dec 2001, Vol. 24, No. 9.

3 Nansel, Ph.D., Waldorf D.C., Cooperstein D.C., AEffective cervical spinal adjustments on lumbar paraspinal muscle tone, evidence for facilitation of intersegmental tonic neck reflexes.@ Journal of Manipulative and Physiological Therapeutics, Vol. 16, No. 2, Feb. 1993.

4 Eliyahu DB, D.C., AMagnetic Resonance Imaging and clinical follow up study: study of 27- patients receiving chiropractic care for cervical and lumbar disc herniations.@ Journal of Manipulative Physiological Therapeutics, Vol. 19, No. 9, Nov-Dec. 1996.

well as, subjective patient improvement. Normal mechanical attitudes could be restored by manipulative reduction of the cervical motion segments.@[5]

Chiropractic management and manipulative therapy for MRI documented cervical disc herniation.

Dr. Eliyahu=s conclusions: APatients with/without nerve root compression secondary to cervical disc herniation can and do respond well to chiropractic care. Chiropractic management of this condition can and should be employed prior to more evasive treatment.@[6]

Randomized clinical trial of manual therapy and physiotherapy for persistent back and neck complaints sub-group analysis and relationship between Outcome measures.

The article by Koes, Ph.D. et al. concluded: AThe sub-group analysis suggests better results of manual therapy compared to physiotherapy in chronic patients (duration of present complaints of one year or longer) in patient younger than 40-years old.[7]

Electromyography of elevata scapulae: New findings allow test of head stabilization model.

To evaluate the relationship between cervical function and shoulder function a study by David Eliot, indicated: AUnderstanding the recruitment patterns of shoulder girdle prime mover muscles will allow meaningful exploration of non prime mover neck muscle activity during arm and shoulder efforts. This study identifies exercises that isolate recruitment of the elevata scapulae from recruitment of the upper trapezius. The exercises will be used for electromyographic experiments in which the head stabilizing roles of other neck muscles will be explored.@

His conclusions were: AThe elevata scapula=s torque to be counteractive in arm extension produces ipsilateral rotation, lateral flexion and extension of the neck; trapezius rotate the head contra laterally during scapular plain arm elevation. These distinct and relatively simple cases: (Shoulder girdle prime mover affecting prime posture at a time) are appropriate exercises for experimental exploration of their recruitment patterns of potential head stabilizers during arm/shoulder efforts.@[8]

Radiographic findings of the cervical spine in tension-type of headaches.

With respect to cervical spine function, a paper published by Nagasawa, A., Toshimasa, S., and Takahasi, A., discussed the relationship of the cervical curve with the frequency of headaches. They determined that the degree of the cervical lordosis was related to the state of the health and the functional capacity of the individual.[9]

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5 Carrick FR, D.C., Ph.D., ACervical radiculopathy diagnosis and treatment of pathomechanics of the cervical spine.@ Journal of Manipulative and Physiological Therapeutics, Vol. 6, No. 3, Sept. 1983.

6 Eliyahu DB, D.C. AChiropractic management and manipulative therapy for MRI documented cervical disc herniation.@ Journal of Manipulative and Physiological Therapeutics, Vol. 17, No. 3, Mar-Apr 1994.

7 Koes, Ph.D. et al. " Randomized clinical trial of manual therapy and physiotherapy for persistent back and neck complaints sub-group analysis and relationship between Outcome measures." Journal of Manipulative and Physiological Therapeutics, Vol. 16, No. 4, May 1993.

8 Eliot, D. "Electromyography of elevata scapulae: New findings allow test of head stabilization model.@ Journal of Manipulative and Physiological Therapeutics, Vol. 19, No. 1, Jan 1996.

9 Nagasawa A, Toshimasa S, Takahasi A. "Radiographic findings of the cervical spine in tension-type of headaches.@ Headache, 1993 Feb; 33(2):90-5.

Cervicogenic dysfunction muscle contraction headaches and migraine: A descriptive study.

This article discussed how straightened or a reversed cervical spine configurations were associated with tension and migraine headaches.[10]

Changes in neck electromyography associated with meningeal noxious stimulation.

In this study, Dr. Hu, Vernon, and Tatourian demonstrated that introducing an irritant of mustard oil to the meningeal-dural vascular tissues resulted in increased tone of the neck muscles.

They concluded: AThese results document that meningeal-dural vascular irritation leads to sustained and reversible activation of neck and jaw muscles that may be related to the clinical occurrence of muscular tension and pain associated with certain types of headaches, particularly migraine.@[11]

Effectiveness of upper vs. lower cervical adjustments with respect to the amelioration of passive rotational vs. lateral-flexion-end-range asymmetries in otherwise asymptomatic subjects.

Dr. Nansel=s research indicated: ATreatments revealed that lower cervical adjustments were far more effective for the amelioration of lateral flexion asymmetries than were upper cervical ones, whereas upper cervical adjustments were found to be more effective for the amelioration of rotational asymmetries than those delivered to the lower cervical region.@

These results are consistent with the view that passive movement restriction exhibited along the rotational axes is attributable to factors related primarily to the upper cervical region, whereas restrictions of passive movement along the lateral axes are more attributed to factors related to the lower cervical regions.[12]

Effectiveness of traditional bone setting in chronic neck pain: randomized clinical trial

ATraditional bone setting which is a soft manual mobilization technique focusing on the muscles, joints, and ligaments appears to be effective if chronic neck pain. Two thirds of the subjects experienced it as beneficial and it seems to be able to improve disability and pain in patients with chronic neck pain. Subjectively and partially objective benefits of traditional bone setting were found in those patients more than after other interventions and the effects lasted at least for one year.@

A recent study comparing traditional bone setting with physical therapy and massage by experienced practitioners, demonstrated significant better outcome with neck pain and the neck disability indexes with traditional bone setting and active physical therapy or massage. It noted, AImprovement of disability and global assessment were; however better, one month after traditional bone setting than after standard physical therapy and massage, both given by experienced therapists.@ [13]

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10 Vernon H, Steinman I, Hagino C. “Cervicogenic dysfunction muscle contraction headaches and migraine: A descriptive study.@ Journal of Manipulative Physiological Therapeutics, 1992 Sept;15(7):418-29.

11 Hu J, Ph.D, Vernon H, D.C., Tatourian I, Ph.D. AChanges in neck electromyography associated with meningeal noxious stimulation.@ Journal of Manipulative Physiological Therapeutics. Nov-Dec; 18(9):577-81.

12 Nansel D, Ph.D. et al. AEffectiveness of upper vs. lower cervical adjustments with respect to the amelioration of passive rotational vs. lateral-flexion-end-range asymmetries in otherwise asymptomatic subjects.@ Journal of Manipulative Physiological Therapeutics, Vol. 15, No. 2, Feb 1992.

13 Zaproudina N, MD. et al. AEffectiveness of traditional bone setting in chronic neck pain: Randomized clinical trial.@ Journal of Manipulative and Physiological Therapeutics. Vol. 30, No. 6, pp 432-437. July/ August 2007.

Three-dimensional head kinematics and clinical outcome of patients with neck injury treated with spinal manipulative therapy: A pilot study

In this study, Osterbauer, D.C., Katheleen Derickson. et al. concluded: ASpinal manipulative therapy may be beneficial to some patients with neck injury, and future study is warranted as a means to promote recovery of patients with neck injuries.@

In the discussion the doctors indicated that, "It is note worthy, however, that two of the ten cases were chronic, that is greater than formal administration, but even their neck pain was reduced after six-weeks. Interestingly, all patients maintained approximately the same level of symptoms as when they emerged from the treatment for up to one year. Thus, they appear to be at a treatment plateau albeit it a lower one than before treatment. Whether further treatment would have resolved these remaining symptoms further is unknown.@[14]

Atlantooccipital and lateral atlantoaxial joint patterns.

Dr. Dreyfus. et al=s study illustrates the relationship of pain referrals from provocative injections of the lateral atlantoaxial and atlantooccipital joints.

Results of the study indicated: AReferred pain was produced with all 10 injections. The lateral atlantoaxial injections resulted in consistent referral patterns, whereas the atlantooccipital referral patterns were varied significantly. Intendance of composite diagram of the experimentally induced pain was created for each joint.@

The conclusions were: AThe study confirms the nociceptive ability of these cervical synovial joints. The study may assist the clinician in the differential diagnosis of head and neck pain.@

This study is a great reference for the relationship of mechanical neck disorders, as often seen in chiropractic offices, particularly this office. We see these cases on a daily basis. They result in neck pain and localized pain in the neck, but also referred pain and associated headaches. This particular paper demonstrates and illustrates diagrams of areas of referred pain which makes most pain drawings that our patients complete all the more important.[15]

Activation of back muscles during voluntary abduction of the contralateral arm in humans

With respect to the relationship of shoulder function and neck involvement the study by Nick Davey and Rebecca M. Lisle, on page 1359, noted: AIf the coordinated activation of limb and trunk muscles is manifest in the central nervous system the question remains: What is the mechanism? It is already known that antagonistic muscles around the spine co-contract during a neutral spine posture to stabilize the body. Activation of these postural muscles in this coordinated way is thought to involve the cerebellum, although the motor program itself appears to originate elsewhere, possibly in the pre-motor areas and primary motor cortex. This idea would support the implications of our current results suggesting that coordinated activation of the limb and back muscles are generated cortically to maintain a stable body

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14 Osterbauer P, DC, Derickson K, et al. AThree-dimensional head kinematics and clinical outcome of patients with neck injury treated with spinal manipulative therapy: A pilot study.@ Journal of Manipulative Physiological Therapeutics, Vol. 15, No. 8, Oct. 1992.

15 Dreyfus et al. AAtlantooccipital and lateral atlantoaxial joint patterns.@ In Spine. Vol. 19, No. 10, 1994, pp. 1125-31.

posture. Limb movements are used to change the center of gravity when balancing, i.e., on a narrow ridge. In this case the limb movements help to compensate for unwanted trunk movements rather than to generate instability as a result of voluntary movement.@

Under the conclusions they indicated: AThese results support the notion that activation of contralateral trunk muscles during sustained arm abduction is at least partially mediated by central coordination of corticospinal out put to the two muscles groups. This information may be of use when developing and improving spinal stabilization training regimes to help regain control of trunk musculature in patients after a neuro trauma.

Under key points for the paper they noted: ACorticospinal excitability change occurs in both lying and standing postures. These results support the notion that stabilizing contractions of back muscles produced when the arm is abducted have a corticospinal origin.@[16]

Comparison of physiotherapy, manipulation and corticosteroid injection for treating shoulder complaints in general practice: Randomized single blind study.

A study looking at the best methods of treatment for shoulder difficulties was done by Winters et al. The article indicated that: AManipulation was superior to physiotherapy after five weeks. After randomization almost 70% of the patient=s in the manipulation group considered themselves to be cured compared to 10% of the physiotherapy group. The results of our study suggests that manipulation is to be preferred to physiotherapy for treating shoulder complaints originating from the shoulder girdle in general practice.@[17]

Manipulative reduction and management of anterior sternoclavicular joint dislocation.

AIntervention consists of a specific joint manipulation for reduction of the dislocation was performed.@

Dr. Kaufman=s conclusions were: AAppropriate intervention of chiropractic examination procedures and imaging techniques culminated in successful resolutions. When such cases are recognized, appropriate management may occur conservatively with judicious application of joint manipulation and adjustic procedures.@[18]

Manual Therapy effective for shoulder dysfunction and pain.

In this study, patients in the intervention group, received usual care and manipulative therapy that included specific manipulations (low-amplitude, high-velocity thrust techniques) and specific mobilizations (high-amplitude, low-velocity thrust techniques) Ato improve overall joint function and decrease any restrictions in movement at single or multiple segmental levels **in the cervical spine and upper thoracic spine and adjacent ribs@ (emphasis added)** This is an important point, as this study

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16 Davey N, Ph.D. Lisle RM, B.S. AActivation of back muscles during voluntary abduction of the contralateral arm in humans.@ In Spine. Vol. 27, No. 12, pp. 1355-60; 2002.

17 Winters, et al. AComparison of physiotherapy, manipulation and corticosteroid injection for treating shoulder complaints in general practice: Randomized single blind study.@ The British Medical Journal, May 5, 1997; pp. 1320-25.

18 Kaufman RL, D.C. AManipulative reduction and management of anterior sternoclavicular joint dislocation.” Journal of Physicotherapeutics, Vol. 20, No. 5, June 1997.

provides evidence that by utilizing spinal manipulations to address shoulder pain and dysfunction, problems in the shoulder (and other extremities) can be addressed through manipulations of the spine. [19]

Cost effectiveness of physiotherapy, manual therapy, and general practitioner care for pain: Economic evaluation of alongside a randomized controlled trial.

The purpose of the study was to, "Evaluate the cost effectiveness of physiotherapy, manual therapy, and care by general practitioners for patients with neck pain@.

A useful study conducted in England demonstrated that, AManual therapy for the treatment of neck pain was more cost-effective than physiotherapy than care by a general practitioner. Manual therapy has significantly lower costs and slightly better effects at 52 weeks compared with physiotherapy and general practitioner care. The clinical outcome measures show that manual therapy resulted in fast recovery than physiotherapy and general practitioner care up to 26 weeks.@

The conclusions of these authors were, "Our economic evaluation alongside a pragmatic randomized control trial showed manual therapy more cost effective than physiotherapy and continued care provided by a general practitioner and the treatment of non-specific neck pain.@ [20]
The ACOEM latest chronic pain guidelines (the chapter of the overall guidelines) recognize the value of chiropractic care for chronic pain. The guidelines recommend adjustments for, "Chronic persistent low back or neck pain and cervicogenic headache@. [21]

To support the need for management of his/her condition, please see the references concerning chronic back pain.

A randomized study published in *Spine* magazine, 2003, tracked 91 patients suffering from chronic low-back pain and followed them with a course of spinal manipulation for one month, three months, and six months. They found that compared to those who received no treatment, the patients who received spinal manipulation reported greater improvement in back pain, greater satisfaction with back care throughout the trial, better physical functioning and mental health at one month, and fewer co-treatments at six months.[22]

A 2002 study in *JMPT* looked at the role of bone setting, a precursor to manipulative therapy, and its effectiveness in prolonged low-back pain. This was a randomized control trial with 114 patients. The Oswestry Disability scores improved in most patients. Visits to health centers for back pain were reduced.

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19 Bergman GJD, Winters JC, Groenier KH, et al. AManipulative therapy in addition to usual medical care for patients with shoulder dysfunction and pain@. Ann Intern Med 2004; 141:4320439.

20 Korthals-De, DOS, Hoving, Tulder, et al. *A* Cost effectiveness of physiotherapy, manual therapy, and general practitioner care for pain: Economic evaluation of along side a randomized controlled trial.@ British Medical Journal. Vol. 326: Apr. 26, 2003.

21 Occupational Medicine. Practice Guidelines, Evaluation and Management of Common Health Problems and Functional Recovery in Workers. Second Edition. 2008 Revision.

22 Licciardone JC, et.al. "Osteopathic manipulative treatment for chronic low back pain: randomized controlled trial." Spine. 2003 Jul 1;28 (13): 1355-62.

It was concluded that traditional bone settings seemed more effective than exercise or physiotherapy on back pain and disability, even at one year after therapy.[23]

A 2003 study in *Spine* magazine followed 204 chronic low-back pain patients. Their disability index and pain ratings were measured, and they were randomly assigned to a manipulation group and consultation group. The results showed that at the 5- and 12-month follow ups, the manipulation and treatment group showed more significant reductions in pain intensity and in self-rated disability than the consultation group.[24]

A 1996 study in *JMPT* followed 174 patients given 5 weeks of spinal manipulative therapy in combination with supervised trunk exercises followed by an additional 6 weeks of supervised exercise alone. There was a sustained reduction in medication use at the 1 year follow up in this spinal manipulation therapy and trunk stabilization exercise group. Continuance of exercise during the follow-up year, regardless of type was associated with a better outcome. This approach is called a Aclinically important improvement over time@ that is considered superior to the expected natural history of long-standing chronic low-back pain. For the management of chronic low-back pain, trunk exercise, in combination with spinal manipulation therapy, seemed to be beneficial and worthwhile.[25]

A 1990 study in the *British Medical Journal* followed 741 patients, randomized them into chiropractic care and traditional hospital outpatient treatment. Results demonstrated that chiropractic treatment was more effective than hospital outpatient management, mainly for patients with chronic or severe back pain. The benefit of about 7 percent points on the Oswestry scale was seen at two years. The benefit of chiropractic treatment became more evident throughout the follow-up period. Secondary outcome measures also showed that chiropractic was more beneficial. It was concluded that for patients with low-back pain in whom manipulation is not contraindicated, chiropractic almost certainly confers worthwhile long-term benefit in comparison with hospital outpatient management. The benefit is seen mainly in those with chronic or severe pain.[26]

A 1999 study in *JMPT* randomized patients into a trial comparing acupuncture, non-steroidal anti-inflammatory drugs, and spinal manipulation. The results demonstrated that spinal manipulation was the only intervention that achieved statistically significant improvements, with a reduction of 30.7 percent on the Oswestry Disability Scale and reductions on the visual analog scale of 50 percent for low-back pain. They conclude that in patients with chronic spinal pain syndromes, spinal manipulation, if not contraindicated, results in greater improvement than acupuncture and medicine.[27]

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23 Hemmila HM, Keinanen-Kiukaanniemi SM, Levoska S, Puska P. “Long-term effectiveness of bone-setting, light exercise therapy, and physiotherapy for prolonged back pain: a randomized controlled trial.” J Manipulative Physiol Ther. 2002 Feb; 25(2):99-104.

24 Niemisto L, Lahtinen-Suopanki T, Rissanen P, Lindgren KA, Sarna S, Hurri H. “A randomized trial of combined manipulation, stabilizing exercises, and physician consultation compared to physician consultation alone for chronic low back pain.” Spine. 2003 Oct 1;28(19):2185-91.

25 Bronfort G, Goldsmith CH, Nelson CF, Boline PD, Anderson AV. “Trunk exercise combined with spinal manipulative or NSAID therapy for chronic low back pain: a randomized, observer-blinded clinical trial.” J Manipulative Physiol Ther. 1996 Nov-Dec;19(9):570-82.

26 Meade TW, Dyer S, Browne W, Townsend J, Frank AO. “Low back pain of mechanical origin: randomized comparison of chiropractic and hospital outpatient treatment.” BMJ. 1990 Jun 2;300(6737):1431-7.

27 Giles LG, Muller R. “Chronic spinal pain syndromes: a clinical pilot trial comparing acupuncture, a non-steroidal anti-inflammatory drug, a spinal manipulation.” J Manipulative Physiol Ther. 1999 Jul-Aug;22(6):376-81.

A 2000 *JMPT* study did a retrospective study of 119 patient files, comparing their Oswestry Disability Scale and their visual analog pain scale before and after chiropractic treatment. They found an average of 52.5 percent and 52.9 percent reduction in pain and disability, respectively, in the low-back pain group. Most of those with chronic low-back pain had a 20 percent disability reduction and 20-percent pain reduction.[28]

The study of Nansel et al, demonstrated the relationship between cervical adjustments and benefits for case management for low back pain.AResults indicate that cervical spinal manipulation can have significant effects on the tone of the lumbopelvic musculature, presumably by facilitating tonic neck reflexes involving intersegmental spinal pathways@.[29]

Conclusions of this 2004 *JMPT* study indicated, "The manual treatment concept used in the study in low back pain patients appears to reduced pain and disability rating better than the traditional stay-active concept@.[30]

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28 McMorland G, Sutter E. "Chiropractic management of mechanical neck and low-back pain: a retrospective, outcome-based analysis." J Manipulative Physiol Ther. 2000 Jun;23(5):307-11.

29 Nansel DD, Waldorf T, Cooperstein R. AEffect of cervical spinal adjustments on lumbar paraspinal muscle tone: evidence for facilitation of intersegmental tonic neck reflexes@. J Manipulative Physiol Ther. Feb: 16(2): 91-5. 1993.

30 Grunnesoj, Bogefeldt.et al. "Randomized controlled clinical trial of stay-active care vs. manual therapy in addition to stay-active care: functional variables in pain.@ JMPT, 2004; 27: 431-41.