

Chiropractic Treatment in Acute Whiplash Injuries: Grades I & II

Charles G. Davis, DC, QME¹

ABSTRACT

Objective: To assess chiropractic treatment outcomes in patients with acute whiplash injuries.

Clinical Features: 41 patients were treated for whiplash injuries at a private chiropractor's office. Subjects' age ranges 17-67 with a mean of 32.5, SD 13.3. Female 31 subjects, average age 34.5; male 10 subjects, average age 26.5. Data were collected at a spine clinic in California.

Interventions and Outcomes: During the first week of treatment grade III and IV mobilization along with TENS was the primary treatment. Following the first week the treatment was a form of high-velocity, low-amplitude manual therapy. Electrical muscle

stimulation was also used. The treatments were performed by an experienced chiropractor (15+ years in practice) and patient evaluation by CD. The mean initial pain level of grade I injuries was 7.1 (SD 0.9), 95% confidence interval 6.6 – 7.6. The mean final pain level of grade I injuries was 0.6 (SD 0.8), CI 0.1 – 1. The mean number of treatments was 20 (SD 6.6), CI 16.4 – 23.4, and the mean weeks of treatment was 10 (SD 4.5), CI 7.7 – 12.4.

Conclusion: Patients improved under chiropractic care in grades I & II whiplash injuries despite pending litigation.

Key Words: *Chiropractic, whiplash, pain, subluxation, lordosis*

Introduction

Pain is a common complaint of those who seek treatment. Although there are different outcome assessments available, pain outcome was selected in this study. The grading of whiplash injuries followed the Croft & Quebec Task Force grading system. WAD Grade I - neck complaint, WAD Grade II - neck complaint and musculoskeletal signs.¹

Gargan and Bannister² found the rate of recovery following whiplash injury, symptoms within 7 days of accident: 86% symptomatic, 14% symptom free. Patients were more likely to improve between 3 months and 1 year and deteriorate between 1 and 2 years. In a recent study³ between 2 and 7.5 years, 12% described improved symptoms, 29% complained of continuing pain and 33% reported increased severity of symptoms since the accident. Symptoms largely stabilized within 3 months but there was significant fluctuation in symptom severity between 3 months and 2 years. There appears to be a difference in treatment requirements comparing trauma with no-trauma neck pain patients. A recent study found that the mean visits with trauma was 34.69 and with no-trauma 10.13.⁴

Material and Methods

Forty patients were sought in developing a case series of chiropractic treatment of Grade I & II whiplash injuries. Forty-one consecutive patients with soft-tissue injuries of the neck were seen at a chiropractic spine clinic. All subjects presented within one week of the injury. Patients were included in the study if they had been in a motor vehicle collision with inertial type injuries, did not have fractures, and were at least 17 years of age. Excluded were patients under medical control receiving prescription medications or other care, nerve root involvement, pathology other than mild to moderate osteoarthritis, and previous spinal surgery. These subjects would be rated as WAD Grade I or II. Subjects' ages range 17-67 with a mean of 32.5, SD 13.3. Female 31 subjects, average age 34.5; male 10 subjects, average age 26.5.

Initial cervical spine lateral radiographs, along with pre- and post-treatment 0-10 numeric rating pain scale rating were used as measures in this study to assess subjective pain intensity. The average cervical lordotic curve has been reported to be 34 degrees, with an ideal curve to measure 43 degrees.⁵

1. Private Practice
Glendora, CA

The radiographs at presentation were reviewed. The end of treatment occurred when there was no further improvement or the patient stabilized with unchanged status for a period of 3 to 4 weeks. During the first week of treatment Grade III and IV mobilization along with TENS was the primary treatment. Following the first week the treatment was a form of high-velocity, low-amplitude manual therapy. Electrical muscle stimulation was also employed. The treatments and patient evaluation were performed by an experienced chiropractor of greater than fifteen years in practice.

Results

The mean initial pain level of Grade I injuries was 7.1 (SD 0.9), 95% confidence interval 6.6 – 7.6. The mean final pain level of Grade I injuries was 0.6 (SD 0.8), CI 0.1 – 1. The mean number of treatments was 20 (SD 6.6), CI 16.4 – 23.4, and the mean weeks of treatment was 10 (SD 4.5), CI 7.7 – 12.4. (Table 1)

Discussion

The results of this study had 27 of the 41 (66%) subjects reporting a pain level of 0 or 1 at the end of treatment, indicating a resolved condition. Three had a final pain level of 2 and nine had a final pain level of 3. These 12 subjects would be described as slight. Two subjects (4.8%) that would rate at moderate symptom level, had a final pain rating of 4 and 5.

Altered sensory processing is probably involved in the determination of pain and disability in patients with chronic pain after whiplash injury. This mechanism can explain symptoms in the absence of evident tissue damage.⁶ Manipulation-induced analgesia may be a multi-factorial effect resulting from beneficial influences on the chemical environment of joints, facilitation of tissue repair processes, segmental inhibitory processes within the central nervous system, and activation of various descending inhibitory pathways projecting from the brain to spinal cord.⁷ Manual therapy, such as mobilization, manipulation, or adjustment, has demonstrated attenuation of sympathetic hyperactivity⁸⁻¹⁰ and activation of the periaqueductal gray (PAG).¹¹ Low-frequency TENS activates μ -opioid receptors and high-frequency TENS activates δ -opioid receptors, in the spinal cord and RVM.¹² Electrical stimulation has also been shown to decrease the activity of dorsal horn neurons.¹³

The lateral cervical radiographic view is indicated for the routine quantitative assessment of the biomechanical components of vertebral subluxation. This radiographic view has reliability, validity, and clinical outcomes data that evidence its clinical utility in clinical chiropractic practice.

A recent study found a statistically significant association between cervical pain with a lordosis < 20 degrees and a *clinically normal* range for cervical lordosis 31 degrees to 40 degrees.¹⁴ A decrease in the cervical lordotic curve was more predominate in the WAD II Group. A kyphotic posture (+Rx postural displacement found in neutral resting stance) was also found in the WAD II group. Marshall and Tuchin¹⁵ provide evidence that patients involved in a motor vehicle accident injury have a 10° mean reduction in cervical lordosis compared to a control group.

The end of treatment came at a point when the patients' complaints had reached a plateau. This is the point of maximum medical improvement. It did not take into account future medical treatment for flare-ups or ongoing treatment for those subjects who continued to have complaints. All subjects had ongoing litigation at the end of treatment. All of the subjects improved. Limitations of this study include its small size and lack of a control group. A long-term follow-up would also be desirable to determine whether and to what degree the pain levels were maintained.

As chiropractors are involved in treating these types of cases, this study purported to obtain information on the frequency and duration of care and the improvement of the patients. Although many outcome assessments could be used, a numeric pain scale was chosen.

The grading of whiplash disorders: Grade I injuries have neck complaint of pain, stiffness, or tenderness only. The presumed pathophysiology of Grade I pathology includes microscopic or multi-microscopic lesions. Grade II injuries include neck complaint and musculoskeletal signs. Musculoskeletal signs include decreased range of motion and point tenderness. The clinical presentation of Grade II is neck pain with limited range of motion due to muscle spasm, the presumed pathology of neck sprain and bleeding around soft-tissue articular capsules, ligaments, tendons, and muscles, with muscle spasm secondary to soft-tissue injury.¹⁵ Pain is a complex phenomenon with great variability. Chronic pain appears to involve a deficient descending inhibitory process and/or ongoing excitatory input.¹⁶

	WAD I	WAD II
Number	16	25
Mean visits	19.9	34.7
95% CI	16.4 - 23.4	29.8 - 39.7
Minimum	6	15
Maximum	30	66
SD	6.6	12
Wks Treatment	10	18.2
95% CI	7.7 – 12.4	15.1 - 21.2
SD	4.5	7.3
X-ray curve	13.3	1.8
95% CI	9.7 - 16.8	3.9k - 7.5
SD	6.7	13.8
Initial Pain	7.1	7.7
95% CI	6.6 - 7.6	7.4 - 8.0
SD	0.9	0.8
Final Pain	0.6	2.0
95% CI	0.1 - 1.0	1.4 - 2.5
SD	0.8	0.3

Table 1

Mean, 95% confidence interval (CI) & standard deviations.
K – kyphosis
(+Rx postural displacement found in neutral resting stance)

Conclusion

Whiplash injury is not a homogeneous condition. Studies have indicated that complaints involving injuries to the facet, disc or alar ligament are likely to become chronic.¹⁷ The greatest potential for influencing the natural history of whiplash is within 3 months before symptoms become established.³

In this study Grade I patients almost completely recover with this type of treatment and Grade II patients improve substantially. Chiropractic therapy in acute whiplash patients Grade I & II appears to provide at least short-term benefits despite ongoing pending litigation.

References

1. Foreman SM, Croft AC eds. Whiplash injuries: The Cervical Acceleration/Deceleration Syndrome. 3 ed. Philadelphia: Lippincott Williams & Wilkins; 2002.
2. Gargan MF, Bannister GC. The rate of recovery following whiplash injury. *Eur Spine J* 1994;3:162-164.
3. Tomlinson PJ, Gargan MF, Bannister GC. The fluctuation in recovery following whiplash injury 7.5-year prospective review. *Injury* June 2005;36(6):758-761.
4. Haneline MT. Symptomatic outcomes and perceived satisfaction levels of chiropractic patients with a primary diagnosis involving acute neck pain. *J Manipulative Physiol Ther.* 2006 May;29(4):288-96.
5. Harrison DD, Janik TJ, Troyanovich SJ, Holland B. Comparisons of lordotic cervical spine curvatures to a theoretical ideal model of the static sagittal cervical spine. *Spine* 1996; Mar 15;21(6):667-75.
6. Petersen-Felix S, Lars Arendt-Nielsen L, Curatolo M. Chronic Pain After Whiplash Injury—Evidence for Altered Central Sensory Processing. *Journal of Whiplash & Related Disorders* 2003;2(1):5-16.
7. Wright A. Hypoalgesia post-manipulative therapy: a review of a potential neurophysiological mechanism. *Man Ther* 1995 Nov;1(1):11-6.
8. Knutson GA. Significant Changes in Systolic Blood Pressure Post Vectors Upper Cervical Adjustment Vs Resting Control Groups: A Possible Effect of the Cervicosympathetic and/or Pressor Reflex. *J Manipulative Physiol Ther* 2001 Feb;24(2):101-9.
9. Eingorn AM, Muhs GJ. Rationale for Assessing the Effects of Manipulative Therapy on Autonomic Tone by Analysis of Heart Rate Variability. *J Manipulative Physiol Ther* 1999 Mar-Apr;22(3):161-5.
10. Budgell B, Hirano F. Innocuous mechanical stimulation of the neck and alterations in heart-rate variability in healthy young adults. *Auto Neurosci*, 2001 Aug 13;19(1-2)96-9.
11. Sterling M, Jull G, Wright A. Cervical mobilisation: concurrent effects on pain, sympathetic nervous system activity and motor activity. *Manual Therapy* 2001;6(1):72-81.
12. Sluka KA, Hoeger MK, Skyba DA. Mechanisms of Nonpharmacological Treatments for Pain. *Pain* 2002--All Updated Review. Refresher Course Syllabus, edited by Maria Adele Giamberardino. IASR Press. Seattle 2002.
13. Hanai F. Effect of electrical stimulation of peripheral nerves on neuropathic pain. *Spine* 2000; 25:1886-92.
14. McAviney J, Schulz D, Bock R, Harrison DE, Holland B. Determining the relationship between cervical lordosis and neck complaints. *J Manipulative Physiol Ther.* 2005 Mar-Apr;28(3):187-93.
15. Marshall DL, Tuchin PJ. Correlation of cervical lordosis measurement with incidence of motor vehicle accidents. *Australas Chiropr Osteopathy.* 1996 Nov;5(3):79-85.
16. Davis C. Chronic pain/dysfunction in whiplash-associated disorders. *J Manipulative Physiol Ther* 2001;24:44-51.
17. Barnsley L, Lord S, Bogduk N. Whiplash injury. *Pain.* 1994 Sep;58(3):283-307.