

2-24-2018

Manual Physical Therapy and Cervical Joint Position Training for Cervicogenic Dizziness Following Whiplash-Associated Disorder: A Case Report

Melanie Friedman

University of St. Augustine for Health Sciences, m.friedman@usa.edu

Kayla Smith

University of St. Augustine for Health Sciences, ksmith@usa.edu

Follow this and additional works at: <https://soar.usa.edu/pt>

 Part of the [Physical Therapy Commons](#)

Recommended Citation

Friedman, Melanie and Smith, Kayla, "Manual Physical Therapy and Cervical Joint Position Training for Cervicogenic Dizziness Following Whiplash-Associated Disorder: A Case Report" (2018). *Physical Therapy Collection*. 45.
<https://soar.usa.edu/pt/45>

This Conference Proceeding is brought to you for free and open access by the Faculty and Staff Research at SOAR @ USA. It has been accepted for inclusion in Physical Therapy Collection by an authorized administrator of SOAR @ USA. For more information, please contact soar@usa.edu.

Abstract Submission- CSM 2018

Melanie Friedman, SPT and Dr. Kayla Smith, PT, DSc, OCS, COMT

Title Manual physical therapy and cervical joint position training for cervicogenic dizziness following whiplash-associated disorder: A case report

Background and Purpose Whiplash is defined as an acceleration-deceleration injury to the neck, which may lead to a variety of immediate and/or prolonged symptoms collectively known as whiplash-associated disorder (WAD). Cervicogenic dizziness is one possible sequelae that may arise from dysfunction within the structures of the cervical spine, disrupting the flow of sensory and proprioceptive feedback. The purpose of this case report is to demonstrate the efficacy of combining manual physical therapy and cervical joint position training on a patient with cervicogenic dizziness status-post motor vehicle accident (MVA).

Case Description A 28-year-old female with a history of MVA and chief complaint of a one-month history of progressive increase in left-sided headache and dizziness was referred to physical therapy from her primary care physician with a diagnosis of Benign Paroxysmal Positional Vertigo (BPPV). Physical therapy evaluation revealed impairments including joint mobility deficits, cervical joint position sense error, muscle imbalances and decreased neuromotor control. Functional limitations included difficulty with looking up and down, working on the computer, and carrying her child. At the time of initial evaluation, the frequency of symptoms was reported as a minimum of four days a week, for 75% of the day. The patient was seen two times per week for three weeks for a total of six sessions. Interventions included manual therapy, cervical joint

proprioception training, cervico-scapular stabilization, and therapeutic exercise including a home exercise program.

Outcomes Numerical Pain Rating Scale (NPRS) values improved from 5/10 to 0/10, Dizziness Handicap Inventory (DHI) scores significantly improved from 32/100 to 2/100, and Cervical Joint Position Error decreased to below the meaningful error value at the time of discharge. The patient reported no headaches or dizziness for ten days prior to discharge and denied limitations in function.

Discussion This case report supports the use of physical therapy intervention, including cervical joint position training and manual physical therapy, in the treatment of a patient status-post MVA with cervicogenic dizziness.

References

1. Spitzer WO. Scientific monograph of the Quebec task force on whiplash-associated disorders: Redefining 'whiplash' and its management. *Spine*. 1995;20:1-73.
2. Tournier C, Hours M, Charnay P, Chossegros L, Tardy H. Five years after the accident, whiplash casualties still have poorer quality of life in the physical domain than other mild injured casualties: analysis of the ESPARR cohort. *BMC Public Health*. 2016;16:1-13. Doi:10.1186/s12899-015-2647-8
3. Sterling M. Physiotherapy management of whiplash-associated disorders (WAD). *J of Physiotherapy*. 2014;60:5-12.
4. Sterling M. Whiplash-associated disorder: musculoskeletal pain and related clinical findings. *J of Manual and Manipulative Therapy*. 2011;19(4):194-200. Doi: 10.1179/106698111x13129729551949.
5. Motor Accidents Authority: *Guidelines for the management of acute whiplash-associated disorders – for health professionals*. Sydney: third edition 2014.
6. Henrikson BH, Lampa E, Marklund S, Wanman A. Pain and disability in the jaw and neck region following whiplash trauma. *J Dental Research*. 2016;95(10):1155-1160. Doi: 10.1177/0022034516653598
7. Jull G. Whiplash continues its challenge. *J Orthop Sports Phys Ther*. 2016;46(10):815-817. Doi:10.2519/jospt.2016.0112.
8. Racicki S, Gerwin S, DiClaudio S, Reinmann S, Donaldson M. Conservative physical therapy management for the treatment of cervicogenic headache: a systematic review. *J Manual and Manipulative Ther*. 2013;21(2):113-124. Doi: 10.1179/2042618612Y.0000000025.

9. Jull G, Sterling DF, Treleaven J, O'Leary S. Whiplash, Headache, and Neck Pain: Research-Based Directions for Physical Therapies. 1 ed. Edinburgh: Churchill Livingstone; 2008.
10. AlSaif AA, Johnson EG. Cervicogenic dizziness: implications for physical therapy. *Indian J Physiother and Occ Ther.* 2011;5(4):6-11.
11. Headache Classification Subcommittee of the International Headache Society. The international classification of headache disorders. 2nd ed. *Cephalgia.* 2004;24:suppl 1.
12. Rodeghero J, Smith AR. Role of manual physical therapy and specific exercise intervention in the treatment of a patient with cervicogenic headaches: a case report. *J of Manual and Manipulative Therapy.* 2006;14(3):159-167.
13. Duijn JV, Duijn AJV, Nitsch W. Orthopaedic manual physical therapy including thrust manipulation and exercise in the management of a patient with cervicogenic headache: a case report. *J Manual and Manipulative Ther.* 2007;15(1):10-24.
14. Vinokumar A, Desai P. Efficacy of mobilization versus strength training in patients with chronic cervicogenic headache. *Indian J Physiother and Occ Ther.* 2016;10(3):1-6. Doi: 10.5958/0973-5674.2016.00073.3.
15. Zito G, Jull G, Story I. Clinical tests of musculoskeletal dysfunction in the diagnosis of cervicogenic headache. *Man Ther.* 2006;11:118-129.
16. Shrivastava S, Srivastava N, Joshi S. A study to compare the efficacy of MFR along with conventional therapy v/s conventional therapy along in the management of cervicogenic headache. *Indian J of Physiother and Occ Ther.* 2015;9(4):44-50.
17. Reid SA, Rivett DA, Katekar MG, Callister R. Comparison of Mulligan sustained natural apophyseal glides and Maitland mobilizations for treatment of cervicogenic dizziness: a randomized controlled trial. *Physical Therapy.* 2014;94(4):466-476.
18. Jull G, Trott P, Potter H, et al. A randomized controlled trial of exercise and manipulative therapy for cervicogenic headache. *Spine.* 2002;27(17):1835-1843.
19. Jull G, Falla D, Treleaven J, Hodges P, Vicenzino B. Retraining cervical joint position sense: the effect of two exercise regimes. *J Orthop Res.* 2007;25:404-412. Doi: 10.1002/jor.20220.
20. Lee MY, Lee HY, Yong MS. Characteristics of cervical position sense in subjects with forward head posture. *J Phys Ther Sci.* 2014;26(11):1741-1743.
21. Herr KA, Spratt K, et al. Pain intensity assessment in older adults: use of experimental pain to compare psychometric properties and usability of selected pain scales with younger adults. *Clin J Pain.* 2004;20(4):207-219.
22. APTA *Guide to Physical Therapist Practice 3.0.* Alexandria, VA: American Physical Therapy Association; 2014. Available at: <http://guidetoptpractice.apta.org/>. Accessed January 18, 2017.
23. Rosendorff C, Black HR, Cannon CP. Treatment of hypertension in the prevention and management of ischemic heart disease. *Circulation.* 2007;115:2761-2788.
24. Youdas J, Cary J, Garrett T. Reliability of measurement of cervical spine ROM: Comparison of three models. *Phys Ther.* 1991;71:98-106.
25. Kendall FP, McCreary EK, Provance PG, Rodgers MM, Romani WA. *Muscles: Testing and Function With Posture and Pain.* 5th ed. Baltimore, MD: Lippincott Williams and Wilkins, 2005.
26. Barr AE, Diamond BE, Wade CK, et al. Reliability of testing measures in Duchenne or Becker muscular dystrophy. *Arch Phys Med Rehabil.* 1991;72:315-319.

27. Paris SV, Loubert PV. *Foundation of Clinical Orthopedics*. 3rd ed. St. Augustine, FL: Institute Press, 1999.
28. Landel R, Kulig K, Fredericson M, Li N, Powers CM. Intertester reliability and validity of motion assessments during lumbar spine accessory motion testing. *Physical Therapy*. 2008;88(1):1-7.
29. Schoeps P, Pflingsten M, Siebert U. Reliabilität manueller diagnostischer Untersuchungstechniken an der Halswirbelsäule. Studie zur Qualitätssicherung in der manuellen Diagnostik. *Z Orthop Ihre Grenzgeb*. 2000;138:2-7.
30. Harris KD, Heer DM, Roy TC, Santos DM, Whitman JM, Wainner RS. Reliability of a measurement of neck flexor muscle endurance. *Phys Ther*. 2005;85(12):1349-1355.
31. Hunt A, Mah K, Reed N, Engel L, Keightley M. Oculomotor-based vision assessment in mild traumatic brain injury: a systematic review. *J Head Trauma Rehabil*. 2016;31(4):252-261.
32. Jorns-Haderli M, Straumann D, et al. Accuracy of the bedside head impulse test in detecting vestibular hypofunction. *J Neurol Neurosurg Psychiatry*. 2007;78(10):1113-1118.
33. Wrisley D, Whitney S. The effect of foot position on the modified clinical test of sensory interaction and balance. *Arch Phys Med Rehabil*. 2004;85(2):335-338.
34. Weber PC, Cass SP. Clinical assessment of postural stability. *Am J Otol*. 1993;14(6):566-569.
35. Bhattacharyya N, Baugh RF, Orvidas L, et al. Clinical practice guideline: Benign paroxysmal positional vertigo. *Otolaryngology- Head Neck Surg*. 2008;139:S47-S81.
36. Jacobson GP, Newman CW. The development of the dizziness handicap inventory. *Arch Otolaryngol Head Neck Surg*. 1990;116(4):424-427. Doi: 10.1001/archotol.1990.01870040046011
37. Treleaven J, Jull G, et al. Smooth pursuit neck torsion test in whiplash-associated disorders: relationship to self-reports of neck pain and disability, dizziness and anxiety. *J Rehabil Med*. 2005;37(4):219-223.
38. Kristjansson E, Treleaven J. Sensorimotor function and dizziness in neck pain: Implications for assessment and management. *JOSPT*. 2009;39(5):364-377.
39. Davenport TE. Clinical case reporting in the peer-reviewed physical therapy literature: time to move toward functioning. *Physiother Res Int*. 2015;20:220-230.
40. World Health Organization. *International Classification of Functioning, Disability and Health: ICF*. Geneva, Switzerland: World Health Organization; 2001.
41. Schenkman M, Deutsch JE, Gill-Body KM. An integrated framework for decision making in neurologic physical therapist practice. *Phys Ther*. 2006;86:1681-1702.
42. Olson KA. *Manual physical therapy of the spine*, 2nd ed. St. Louis, MO: Elsevier Inc; 2016.
43. Moon HJ, Goo BO, Kwon HY, Jang JH. The effects of eye coordination during deep cervical flexor training on the thickness of the cervical flexors. *J Phys Ther Sci*. 2015;27(12):3799-3801. Doi: 10.1589/jpts.27.3799
44. Jull G, Kristjansson E, Dall'Alba P. Impairment in cervical flexors: a comparison of whiplash and insidious onset neck pain patients. *Man Ther*. 2004;9:89-94
45. Sciascia A, Kuschinsky N, Nitz AJ, Mair SD, Uhl TL. Electromyographical comparison of four common shoulder exercises in unstable and stable shoulders. *Rehabilitation Research and Practice*. 2012;1-11. doi: 10.1155/2012/783824.

46. Fennell J, Phadke CP, Mochizuki G, Ismail F, Boulias C. Shoulder retractor strengthening exercise to minimize rhomboid muscle activity and subacromial impingement. *Physiotherapy Canada*. 2016;68(1):24–28. doi: 10.3138/ptc.2014-83.
47. Portillo-Soto A, Eberman LE, Demchak TJ, Peebles C. Comparison of blood flow changes with soft tissue mobilization and massage therapy. *J Alt and Complementary Med*. 2014;20(12):932-936. Doi:10.1089/acm.2014.0160
48. Sefton JM, Yarar C, Berry JW, Pascoe DD. Therapeutic massage of the neck and shoulders produces changes in peripheral blood flow when assessed with dynamic infrared thermography. *J Alt and Complementary Med*. 2010;16(7):723-732. Doi:10.1089/acm.2009.0441
49. Baker RT, Nasypany A, Seegmiller JG, Baker JG. The Mulligan concept: mobilizations with movement. *Internation J Ath Ther Train*. 2013;18(1):30-34.
50. O’Leary S, Jull G, Kim M, et al. Specificity in retraining craniocervical flexor muscle performance. *J Orthop Sports Phys Ther*. 2007;37(1):3-9.
51. Barbero M, Falla D, Mafodda L et al. The location of peak upper trapezius muscle activity during submaximal contractions is not associated with the location of myofascial trigger points: new insight revealed by high-density surface EMG. *Clin J of Pain*. 2016;32(12):1044-1052. DOI: 10.1097/AJP.0000000000000373
52. Bodes-Pardo G, Pecos-Martín D, Gallego-Izquierdo T, Salom-Moreno J, Fernández-de-las-Peñas C, Ortega-Santiago R. Manual treatment for cervicogenic headache and active trigger point in the sternocleidomastoid muscle: a pilot randomized clinical trial. *J Manipulative Physiol Ther*. 2013;36(7):403–411. doi:10.1016/j.jmpt.2013.05.022.
53. Gabriel DA, Kamen G, Frost G. Neural adaptations to resistive exercise: mechanisms and recommendations for training practices. *Sports Medicine*. 2006;36(2):133-149.
54. Seynnes OR, de Boer M, Narici MV. Early skeletal muscle hypertrophy and architectural changes in response to high-intensity resistance training. *J Applied Physiol*. 2007;102(1):368-373. Doi: 10.1152/jappphysiol.00789.2006.
55. Daenen L, Nijs J, Roussel N, Wouters K, Loo MV, Cras P. Sensorimotor incongruence exacerbates symptoms in patients with chronic whiplash associated disorders: an experimental study. 2012;51:1492-1499. Doi: 10.1093/rheumatology/kes050.
56. Don S, De Kooning M, Voogt L, Ickmans K, Daenen L, Nijs J. The effect of visual feedback of the neck during movement in people with chronic whiplash-associated disorders: an experimental study. *JOSPT*. 2017;1-33. Doi:10.2519/jospt.2017.6891.
57. Rivett D, Shirley D, Magarey M, Refshauge K. Australia Physiotherapy Association: *Clinical guidelines for assessing vertebrobasilar insufficiency in the management of cervical spine disorders*. Victoria: second edition; 2006.
58. Magee DJ. *Orthopedic Physical Assessment*, 6th ed. St. Louis, MO: Saunders; 2014.
59. Hutting N, Scholten-Peeters GGM, Vijverman V, Keesenberg MDM, Verhagen AP. Diagnostic accuracy of upper cervical spine instability tests: a systematic review. *Phys Ther*. 2013;93(12):1686-1695.
60. Uitvlugt G, Indenbaum S. Clinical assessment of atlantoaxial instability using the Sharp-Purser test. *Arthritis Rheum*. 1988;31:918-922.
61. Mintken PE, Metrick L, Flynn T. Upper cervical ligament testing in a patient with os odontoideum presenting with headaches. *JOSPT*. 2008;38(8):465-475.

62. Hall T, Chan HT, Christensen L, Odenthal B, Wells C, Robinson K. Efficacy of a C1-C2 self sustained natural apophyseal glide (SNAG) in the management of cervicogenic headache. *JOSPT*. 2007;37(3):100-107.
63. Drottning M, Staff PH, Sjaastad O. Cervicogenic headache (CEH) six years after whiplash injury. *Functional Neurology*. 2007;22(3):145-149.
64. Dizziness Handicap Inventory. Michigan State University- Rehabilitation Web site. http://www.rehab.msu.edu/_files/_docs/Dizziness_Handicap_Inventory.pdf Accessed February 2017.
65. HEP2go Web site. www.hep2go.com Published 2010. Updated 2017. Accessed February 2017.