

Whiplash and Whiplash Associated Disorders: Classifications and Associated Treatment Guide

Jason Lydell, DPT



SYMPOSIUM

Disclosures

None

Learning Objectives

- Identifying a whiplash or whiplash associated disorder.
- Introduce current evidence-based understanding of whiplash and whiplash associated disorders.
- Differentiate the difference between Whiplash Classifications
- Reviewing treatment outcomes and prognosis associated with Whiplash classifications.

Health Care and Community Relevance

MVAs causing injury in Nebraska 2020:

Motor vehicle related accidents: 9,847

People injured: 14,100

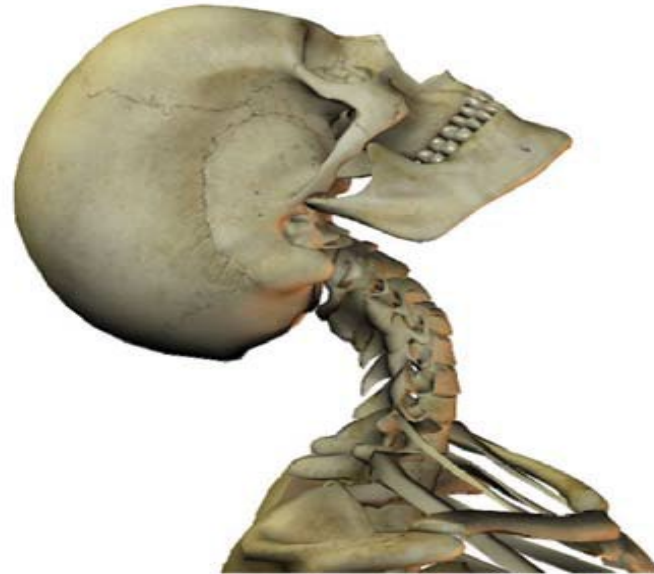
Prevalence of Whiplash injuries:

7.7% in men, 9.6% in women (2020 G. Kumagai)

What is whiplash?

Quebec Task Force definition:

- An injury caused by an acceleration- deceleration mechanism of energy transfer to the neck.
- S-shaped curve



Type of Injuries

Mechanical potential to cause injury to:

- cervical bone
- intervertebral disks
- spinal cord
- nerve roots
- ligaments
- cervical muscle

Most common injury:

- Strains and dysfunctions of cervical muscle

Whiplash Associated Disorders: Symptoms

Symptoms can arise immediately following injury or delayed

- Delay time has been noted up to 72 hours

Primary Symptoms:

- Neck and shoulder pain, widespread tenderness, stiffness with movement

Whiplash Associated Disorders: Symptoms

30 to 50% of whiplash injuries will develop secondary symptoms

including any number of the following:

(Neurological)

- Radicular UE pain/ numbness/ tingling , vertigo, visual and auditory disturbances, Photophobia, dysphonia, dysphagia, and headaches

(Parasympathetic)

- Palpitations, chest tightness, nausea, gastrointestinal disturbances, hyperhidrosis, cold sensation, poor circulation, and unstable blood pressure

(Psychological)

- Depression, distraction, obsession, irritability, memory loss, anxiety, and insomnia

QTF's Classification System

Purpose:

- To indicate severity of injury
- To help set prognosis expectations
- Interdisciplinary communication
- Patient education

QTF: WAD classification

QTF Grade	Symptoms
WAD 0	<ul style="list-style-type: none">• No physical signs of dysfunction• No complaints of pain
WAD I	<ul style="list-style-type: none">• No physical signs of dysfunction• Complaints of neck pain/tenderness
WAD II	<ul style="list-style-type: none">• Musculoskeletal signs and symptoms• Complaints of neck pain/tenderness
WAD III	<ul style="list-style-type: none">• Neurological signs and symptoms• Musculoskeletal signs and symptoms• Complaints of pain, often radiating into and down the arm
WAD IV	<ul style="list-style-type: none">• Fracture or dislocation (revealed by radiographic studies)• Complaints of pain

Classification: WAD 1

Symptoms:

- Neck pain and stiffness

Signs:

- No significant musculoskeletal findings

Normally resolves within 2 to 3 weeks of neck rest and anti-inflammatory medication

Physical Therapy not required

Note: Symptoms that persist beyond this time require reassessment for musculoskeletal injury

Classification: WAD 2

Symptoms:

- Neck pain and stiffness

Signs:

- Significant musculoskeletal findings

Examples: decreased cervical ROM, palpable cervical muscle spasms

Normally resolves in 3 weeks to 3 months with outpatient treatment including:

- Physical Therapy to address ROM, strength, joint mobility, and pain
- Beginning therapy as soon as possible to improve outcomes

Cases lasting longer than 3 months are unlikely to resolve with continuation of treatment

Classification: WAD 3

Symptoms:

- Neck pain, shoulder pain, radicular pain the UEs

Signs:

- Significant musculoskeletal findings and Neurological findings

Examples: UE numbness and tingling with cervical or shoulder movement

Normally resolves in 1 month to 3 months with outpatient treatment including:

- Physical Therapy to address ROM, strength, joint mobility, and pain
- Beginning therapy as soon as possible to improve outcomes

Cases lasting longer than 3 months are unlikely to resolve with continuation of treatment

Classification: WAD 4

Symptoms:

- Neck pain and usually instability

Signs:

- Fracture or dislocation confirmed with Radiography

Medical emergency and may require surgical intervention

Physical Therapy necessity is determined by Orthopedic surgeon based on individual patient needs.

Chronic Symptoms Likelihood

High evidence

- Pain level: $\geq 6/10$ on NPS
- High Neck Disability Index ≥ 15
- Classification: WAD II and WAD III

Moderate evidence

- PTSD resulting from same injury
- Cold hypersensitivity
- Hyperalgesia/ mechanical hypersensitivity

No Effect on Outcomes

- Angular deformity of neck
- Impact direction
- Seated position
- Awareness of collision
- Head rest in place
- Vehicle speed

Treatment Approach

Not one size fits all

- Heterogenous presentation and approach

If WAD 1: let healing occur naturally (i.e. 1x/week)

- Early education, neck ROM exercise, encouragement of non-provocative activity

If WAD 2 or 3 trajectory, see more frequently (i.e. 2-3x/week)

Comprehensive evaluation and assessment is key

No cervical collar

Acute PT Treatment

Clinicians should provide multimodal approach that includes

- Cervical traction, and cervical and thoracic mobilizations
- Cervical ROM exercises
- Upper extremity strengthening
- Scapular mobility exercises

Education on

- Returning to pre-accident, non-provocative activity
- Symptom education
- Postural education, and HEP

Subacute PT Treatment

- Continuation on Acute treatments if necessary
- Provide neck and shoulder girdle endurance exercises
- May provide cervical manipulations or mobilizations, traction to improve joint mobility AROM, and pain

Chronic Treatment

Provide multimodal approach

- Mixed exercises for scapulothoracic and cervical regions
- Modalities - dry needling, laser, TENs, infrared.
- Mobilization combined with individualized, progressive, submaximal exercise along with strength, endurance, flexibility and coordination
- Pain education, symptom education

Education on fear avoidance behaviors

Modalities for Chronic Symptoms

Low frequency electric stimulation therapy and far- infrared irradiation therapy

- Significantly improved chronic neurological and somatic WAD symptoms
- Researchers found an 80% recovery rate of 22 representative symptoms

Summary

Classifying whiplash injuries:

- Determines severity of injury
- Guides treatment and prognosis
- Enhances interdisciplinary communication and expectations
- Enhances patient education and expectations

Early intervention leads to better outcomes

Symptom education and individualized tolerance based exercises are imperative to treatment

References

1. Elliot JM, Noteboom JT, Flynn TW, Sterling M. Characterization of acute and chronic whiplash- associated disorders. JOSPT. 2009;39(5):312-23.doi: 10.2519/jospt.2009.2826. Accessed January 13, 2019.
2. Sterling M. Physiotherapy management of whiplash-associated disorders (WAD). *Journal of Physiotherapy*. 2014; 60: 5-12.[doi:10.1016/j.jphys.2013.12.004](https://doi.org/10.1016/j.jphys.2013.12.004). Accessed January 25,2019.
3. Fritz J. Toward improving outcomes in whiplash: implementing new directions of care. JOSPT.2017;47(7):447-448. doi: 10.2519/jospt.2017.0107. Accessed January 25,2019.
4. Walton DM, Elliot JM. An integrated model of chronic whiplash-associated disorder. JOSPT.2017;47(7):462-471. doi: 10.2519/jospt.2017.7455. Accessed January 26,2019.
5. Walton DM, Carroll LJ, Kasch H, et al. An overview of systematic reviews on prognostic factors in neck pain: results from the International Collaboration on Neck Pain (ICON) project. *Open Ortho J*. 2013;7:494-505.<http://dx.doi.org/10.2174/18743250001307010494>. Accessed January 18, 2019

References

6. Ritchie C, Sterling, M. Recovery pathways and prognosis after whiplash injury. *JOSPT*. 2016; 46: 851-861. <https://www.jospt.org/doi/pdf/10.2519/jospt.2016.6918>. Accessed January 18, 2019
7. Walton DM, MacDermid JC, Giorgianna AA, Mascarenhas JC, West SC, Zammit CA. Risk factors for persistent problems following acute whiplash injury: update of a systematic review and meta-analysis. *JOSPT*. 2013;43:31-43. <http://dx.doi.org/10.2519/jospt.2009.2765>. Accessed January 18, 2019
8. Sterling M, Hendrikz J, Kenardy J. Similar factors predict disability and posttraumatic stress disorder trajectories after whiplash injury. *Pain*. 2011;152:1272-1278. <http://dx.doi.org/10.1016/j.pain.2011.01056>. Accessed January 18, 2019

References

9. Goldsmith R Wright C, Bell SF, Rushton A. Cold hyperalgesia as a prognostic factor in whiplash associated disorders: a systematic review. *JMT*. 2012;17:402-410.
<http://dx.doi.org/10.1016/j.math.2012.02.014>. Accessed January 18, 2019
10. Elbers NA, Akkermans AJ, Lockwood K, Craig A, Cameron ID. Factors that challenge health for people involved in the compensation process following a motor vehicle crash: a longitudinal study. *BMC Public Health*. 2015;15:339. <http://dx.doi.org/10.1186/s12889-015-1694-5>. Accessed January 18, 2019
11. Sterling M, Hendrikz J, Kenardy J. Compensation claim lodgement and health outcome developmental trajectories following whiplash injury: a prospective study. *Pain*. 2010;150:22-28.
<http://dx.doi.org/10.1016/j.pain.2010.02.013>. Accessed January 18, 2019
12. Ritchie C, Hendrikz J, Kenardy J, Sterling M. Derivation of a clinical prediction to identify both chronic moderate/severe disability and full recovery following whiplash injury. *Pain*. 2013;154:2198-2206.
<http://dx.doi.org/10.1016/j.pain.2013.07.001>. Accessed January 18, 2019

References

13. Bussieres A, Steward G, Al-Zoubi F, Decina P et al. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. *JMPT*. 2016;39:532-564. <https://doi.org/10.1016/j.jmpt.2016.08.007>. Accessed January 18, 2019
14. Elkin B, Elliot J, Siegmund G. WHiplash injury or concussion? A possible biomechanical explanation for concussion symptoms in some individuals following a rear-end collision. *JOSPT* 2016; 46:874-885. <https://doi.org/10.2519/jopst.2016.7049>. Accessed January 18, 2019
15. Wong JJ, Shearer HM, Mior S, et al. Are manual therapies, passive physical modalities, or acupuncture effective for the management of patients with whiplash associated disorders or neck pain and associated disorders? An update of the Bone and Joint Decade Task Force on Neck Pain and Its Associated disorders by the OPTIMa collaboration. *The Spine Journal*. 2016;16(12):1598-1630. Doi:10.1016/j.spinee.2015.08.024. Accessed February 1st, 2019

References

16. Neck Pain Guidelines: Revision 2017: Using the Evidence to Guide Physical Therapist Practice. *Journal of Orthopaedic & Sports Physical Therapy*. 2017;47(7):511-512. doi:10.2519/jospt.2017.0507. Accessed February 1st, 2019

17. Michaleff Z, Maher C, Lin C-W, et al. Comprehensive physiotherapy exercise programme or advice for chronic whiplash (PROMISE): a pragmatic randomised controlled trial. *Physiotherapy*. 2015;101. doi:10.1016/j.physio.2015.03.1865. Accessed February 1st, 2019

18. Snodgrass SJ, Rivett DA, Sterling M, Vicenzino B. Dose Optimization for Spinal Treatment Effectiveness: A Randomized Controlled Trial Investigating the Effects of High and Low Mobilization Forces in Patients With Neck Pain. *Journal of Orthopaedic & Sports Physical Therapy*. 2014;44(3):141-152. doi:10.2519/jospt.2014.4778. Accessed February 1st, 2019

19. Michaleff ZA, Maher CG, Lin CW, Rebeck T, Jull G, Latimer J et al. Comprehensive physiotherapy exercise programme or advice for chronic whiplash (PROMISE): a pragmatic randomised controlled trial. *Lancet* 2014;384(9938):133-41. Accessed February 1st, 2019

References

20. Mayo Clinic Staff. Whiplash - Symptoms and causes. *The Mayo Clinic*. <https://www.mayoclinic.org/diseases-conditions/whiplash/symptoms-causes/syc-20378921>. Published: May 3rd, 2018. Accessed: 1 Mar. 2019.
21. Van Oosterwijck, J. , Nijs, J. , Meeus, M. and Paul, L. (2013), Systematic review: Central sensitization in chronic WAD. *EJP*, 2013; 17:299-312. doi:10.1002/j.1532-2149.2012.00193.x. Accessed: Feb 13th, 2019
22. Gonzalez-Iglesias, J. , Fernández-de-Las-Peñas, C. , Cleland, J. , Huijbregts, P. , Gutiérrez-Vega, M. Short-Term Effects of Cervical Kinesio Taping on Pain and Cervical Range of Motion in Patients With Acute Whiplash Injury: A Randomized Clinical Trial. *J Orthop Sports Phys Ther*, 2009; 39(7): 515-521. doi:10.2519/jospt.2009.3072. Accessed: Feb 13th, 2019