

# **Is there a Relationship Between Whiplash-Associated Disorders and Concussion in Hockey?**

**Brain Injury**  
**February 2006; Vol. 20; No. 2; pp. 179-188**

Loriann M Hynes and James P. Dickey  
Human Biology and Nutritional Sciences, University of Guelph, Ontario, Canada

## Whiplash Associate Disorders (WAD) Classification Symptoms

- 0 No neck complaints
- I Complaint of neck pain, stiffness or tenderness
- II Neck complaint with musculoskeletal signs
- III Neck complaint, musculoskeletal signs and neurological signs
- IV Fracture and/or dislocation

## KEY POINTS FROM THIS ARTICLE:

- 1) The objective was to examine the relationship between the occurrence of whiplash-associated disorders and concussion symptoms in hockey players. It is a prospective cohort observational study.
  - 2) Twenty hockey teams were followed prospectively for one season. Team therapists completed acute and 7–10 day follow-up evaluation questionnaires for all of the players who received either a whiplash mechanism or a concussion.
  - 3) There is a strong association between whiplash induced neck injuries and the symptoms of concussion in hockey injuries. “Both should be evaluated when dealing with athletes/patients suffering from either injury.”
  - 4) “If not properly managed, cervical ligament sprains, muscle strains and contusions can result in significant sports-related disability.”
  - 5) “Concussion is the most common sports-related head injury.”
  - 6) “Concussions can occur from whiplash-type mechanisms.”
  - 7) Head injuries can be caused by acceleration neck injuries.
  - 8) “WAD and concussion symptoms can be very similar.” Both can cause:
    - Headache
    - Dizziness
    - Memory loss
- Importantly, these symptoms can occur in WAD grades 0-IV.

- 9) A total of 183 players were followed and 13 subjects received either a whiplash mechanism injury (6 subjects) or a direct blow concussion injury (7 subjects). "All subjects reported concussion symptoms in conjunction with neck complaint:"
- Neck complaint with musculoskeletal signs
  - Headache
  - Dizziness
- 10) "Participants with WAD I and WAD II can display as many concussive symptoms or even more than those experienced by participants with WAD III."
- 11) "Full resolution of concussion symptoms at the 7–10 day follow-up evaluation was reported by 4 of the 13 subjects."
- 12) Only 4 of the 13 subjects (23%) experienced full resolution of both their WAD and concussion symptoms at the follow-up evaluation (7-10 days).
- 13) "This study clearly demonstrates there is an association between whiplash-induced neck injuries and the symptoms of concussion." "All 13 injured players reported symptoms of both injuries; this overlap in symptomology strongly demonstrates the difficulty in definitively diagnosing one injury separately from the other."
- 14) Low velocities are capable of inducing cervical neck injury symptoms in human subjects.
- 15) "It is reasonable that hockey players who experience a head/neck complex acceleration/deceleration may experience a whiplash-associated disorder."
- 16) These symptoms may occur in any of the five clinical classifications for grading whiplash-associated disorders:
- Headache
  - Dizziness
  - Deafness
  - Ringing in the ear
  - Memory loss
  - Dysphagia
  - Temporomandibular joint pain
- 17) Typical concussion symptoms include:
- Headache
  - Dizziness
  - Nausea
  - Unsteadiness/Loss of balance
  - Feeling dazed or stunned
  - Seeing stars
  - Ringing in the ears
  - Double vision

- 18) "The athletes studied in this investigation experienced symptoms of both WAD and concussion after a head and/or neck complex acceleration/deceleration injury."
- 19) "As all subjects in this study displayed symptoms of both injuries, it is recommended that the athlete adequately clear both evaluations before return to play after a WAD and/or concussive injury."
- 20) "It was observed that concussion and WAD injuries are strongly linked."
- 21) "Athletes are susceptible to complications if they receive blows to the head, even minor blows, shortly after receiving a concussion." "Rehabilitation principles state the athlete must be completely asymptomatic before return to sport."
- 22) "It is important for the clinician treating a patient or athlete for WAD to evaluate for symptoms of concussion" and to conduct a "thorough cervical evaluation when dealing with concussed players."
- 23) There is a high degree of overlap between the symptoms of concussion and neck injury.

#### COMMENTS FROM DAN MURPHY

It is uncommon to injure the head without injuring the neck.

It is uncommon to injure the neck without injuring the head.

The symptoms of head injury and neck injury overlap.

All patients who have injured either their neck or their head should have both regions thoroughly evaluated and treated.

An important follow-up to this study is:

Article Review # 12-16:

**The Role of the Cervical Spine in Post-concussion Syndrome**