Whiplash injury

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An acute whiplash injury follows sudden or excessive hyperextension, hyperflexion, or rotation of the neck affecting the soft tissues. It typically results from rear-end or side-impact motor vehicle collisions. Patients commonly present with pain and stiffness in the neck, headache, and upper backache with or without paraesthesia of the upper limbs. Chronic whiplash syndrome is characterized by symptoms that persist for more than 3 months.1 With over half a million people making whiplash injury claims per annum in the UK, it has a major impact on the healthcare and legal systems and also the economy.

Key points

- Whiplash is the most common injury associated with motor vehicle accidents and a major cause of disability and litigation.
- Whiplash-associated disorders (WAD) can be classified by the severity of signs and symptoms from Grade 0 to 4.
- Patients usually complain of neck pain and stiffness in the acute phase, with the majority recovering within 3 months.
- Depression, anxiety, and mood disorders are common in patients with chronic whiplash.
- Reassurance, early mobilization, simple analgesic, and physiotherapy are recommended in acute whiplash (WAD I–III).
- In chronic WAD, multidisciplinary pain clinic referral followed by cognitive behavioural therapy and cervical radiofrequency neurotomy plays an important role.

Clinical features

WAD includes all indirect injuries to the cervical spine. The affected individual most commonly complains of neck pain and stiffness in the acute phase. The other symptoms are headaches, mainly occipital, upper back and shoulder pain, and upper limb pain. Patients may also complain of paraesthesias, numbness, and/or weakness of the upper limbs and may occasionally suffer from dizziness, blurred vision, vertigo, dysphagia, and tiredness. Based on the severity of the symptoms, WAD is classified in five grades (Table 1).

Background

In 1995, whiplash-associated disorders (WAD) was defined by the Quebec task force as ‘Whiplash is an acceleration–deceleration mechanism of energy transfer to the neck. It may result from rear-end or side-impact motor vehicle collisions, but can also occur during diving or other mishaps. The impact may result in bony or soft-tissue injuries (whiplash-injury), which in turn may lead to a variety of clinical manifestations called Whiplash-Associated Disorders’2

The incidence of WAD is very variable among countries, averaging to about nine per 1000 people in the UK, the highest in Europe. WAD is usually seen in rear-end, low-impact collisions, in 90% cases at speeds of <14 mph.3 The trunk is forced back on the seat with hyperextension of the neck and then forward recoil (Fig. 1). The risk of whiplash injury is higher in women (as they have thinner necks), people with short necks, car seats with a low neck rest, and if one or more of the above adverse indicators are noted, the patients usually need a more intensive treatment and possibly an early referral to a physiotherapist, pain physician, or a specialist with interest in WAD.

Patients who develop chronic pain after whiplash injury also suffer from central hypersensitivity, possibly due to the sensitization of dorsal horn neurones. Studies have shown that these patients experience hyperalgesia to cutaneous and muscular stimuli not only in the neck but also at sites away from the primary site of injury. There is thought to be an alteration of the

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167
afferent nociceptive signal from a focus present deep in the tissues of the neck and an imbalance occurring in the descending pain modulation system.\textsuperscript{7}

### Diagnosis

Whiplash or WAD is essentially a diagnosis based on clinical findings. Assessment of a person with an acute whiplash injury includes:\textsuperscript{1}

(i) Confirming a history of sudden or excessive neck extension, flexion, or rotation. Symptoms may be delayed for hours or days after the injury. The two most common symptoms are headache and disabling neck pain, with or without referral to the shoulder or arm.

(ii) Examining for signs of muscular spasm, point tenderness, and neurological problems in the upper or lower limbs. Assess for range of neck movements, if appropriate. Look for ‘red flag’ features suggestive of a serious spinal or other abnormality, including compression of the spinal cord (myelopathy), cancer, severe trauma or skeletal injury, and vascular insufficiency.

(iii) Identifying possible psychosocial barriers to recovery, such as stress, anxiety, or depression (‘yellow flags’). WAD is especially likely to manifest in people with obsessive compulsive behaviour, anxiety, depression, hypochondriasis, and those with high scores of somatization.
Radiological investigations in the acute phase can lead to a large number of false-positive cases. It is important to avoid overinvestigating; these should be held in reserve for patients with ‘Red flag’ features or for those with persistent problems of pain down the arms. Pre-existing degenerative cervical spine disease (especially spondylosis at the C5/6 level) is the most common finding seen radiologically in patients complaining of whiplash injury. Additionally, they may have a minimal loss of the lordotic curve of the cervical vertebrae. Dynamic X-rays of the neck during flexion and extension initially may show a kyphotic angle possibly due to muscle spasm causing decreased mobility at the cervical region with a resultant increase in mobility at the adjacent vertebral level.

**Treatment**

Whiplash injuries are quite difficult to treat because of interactions of various factors such as patient psychology, socioeconomic factors, legal issues, and physical health. The absence of radiological evidence of injury in the symptomatic group further complicates the treatment process for this condition. It was traditionally believed that bed rest and immobilization of the neck with a soft collar was the initial treatment of choice, but this has been refuted. Reassurance, resuming activity as normal, early mobilization, physiotherapy along with isometric exercise with periods of rest intermittently have been associated with better long-term outcomes.

**Acute/subacute whiplash injury**

Acute whiplash injury is defined as symptoms present up to 4 weeks and subacute whiplash when symptoms persist beyond 4 weeks until 12 weeks. Active physiotherapy and manipulation in the acute phase of the injury has a significant role in improving neck pain at 6 months and also increases range of movement of the neck similar to the lordotic curve of the cervical vertebrae. Dynamic X-rays of the neck during flexion and extension initially may show a kyphotic angle possibly due to muscle spasm causing decreased mobility at the cervical region with a resultant increase in mobility at the adjacent vertebral level.5

**Medicolegal implications**

Many interventions have been tried for chronic whiplash injuries; of which, cervical radiofrequency neurotomy (CRFN) facet joints have shown reasonable relief from pain for up to 9 months. Some studies have reported a benefit in nearly 70% of the patients from CRFN. Other interventions like cervical facet joint injections have been used with short-term benefit. Intra-articular corticosteroids, temporomandibular joint treatment, cervical traction, and botulinum toxin injections have been described in the literature, with evidence lacking to support their use currently. A multimodal approach to treatment including cognitive behaviour therapy along with physical and or mechanical therapy and patient education is more effective at 3 months with a higher percentage of patients being satisfied with their pain management when compared with only physical treatment.

For symptom management, along with simple analgesics, patients may be commenced on antineuropathic medications according to NICE clinical guideline 96,12 Patients with neurological deficits undergo more aggressive management including surgical treatment. One-third of the people suffering from brachialgia after chronic whiplash injury may benefit from cervical fusion procedures and nearly half of the patients with nerve impingement have reported pain relief from subacromial decompression.
**Conclusion**

Current evidence supports early mobilization, simple analgesics, reassurance, and active interventions as the best treatment options for WAD I–III. Immediate specialist referral should be made for severe symptomatic WAD III and for all patients with WAD IV. Recovery from whiplash injury can be predictable in most cases. Most patients who are symptomatic at 3 months remain so indefinitely, especially if psychosocial and economic factors are involved.5

**Declaration of interest**

None declared.

**References**


Please see multiple choice questions 17–20.