

Section 10

Nervous system

Alert box

- Any seizure is grounds for immediate cessation of all driving activities.
- Resumption of driving will depend on neurologic assessment of the patient and the nature of the driving activity that is involved.
- Driving after a seizure caused by use of a substance depends on complete abstinence from use of that substance.
- Lack of compliance, including forgotten doses of medications, is grounds for immediate cessation of all driving activities.

10.1 Overview

Safe driving requires concentration, a reasonable level of intelligence and maturity, complete control over all muscle movements and freedom from the distracting influence of severe pain. In addition, a safe driver must always be alert, fully conscious and capable of quickly appreciating and responding to changing traffic and road conditions.

This section lists and discusses the most common neurologic conditions that can adversely affect driving ability.

10.2 Febrile or toxic seizures, benign childhood absence epilepsy and other age-related epilepsy syndromes

Where seizures are directly related to a toxic illness, either in childhood or in adult life, and the patient has fully recovered from the illness, the seizures are of no concern in evaluating a patient's later medical fitness to drive. Some benign childhood epilepsy syndromes remit. These would be of less concern than a current epileptic disorder. A neurologic evaluation should be obtained in all such cases.

10.3 Syncope

A single occurrence of syncope that is fully explained and, based on the etiology, is unlikely

to recur may require no more than careful observation. However, patients who have a history of a number of fainting spells or repeated unexplained falls should not drive until the cause has been determined and successful corrective measures taken.

See section 13.4, Syncope.

10.4 Seizures

As for all conditions, in all instances where a temporal recommendation is made, the time period should be considered a general guideline. Individual circumstances may warrant prolonging or reducing the time period suggested.

The recommendations for seizures are presented in both tabular (Table 2) and textual format.

10.4.1 Single, unprovoked seizure before a diagnosis

Private drivers: These patients should not drive for *at least 3 months* and not before a complete neurologic evaluation — including electroencephalography (EEG) with waking and sleep recording and appropriate neurologic imaging, preferably magnetic resonance imaging (MRI) — has been carried out to determine the cause.

Commercial drivers: Commercial drivers should be told to stop driving all classes of vehicles at once. For these drivers, there is a need for even greater certainty that another seizure will not occur while they are driving. As a minimum, commercial drivers should follow the private driver guideline and not drive private vehicles for at least 3 months after a single, unprovoked seizure. If a complete neurologic evaluation, including waking and sleep EEG and appropriate neurologic imaging, preferably MRI, does not suggest a diagnosis of epilepsy or some other condition that precludes driving, it is safe to recommend a return to commercial driving after the patient has been seizure free for 12 months.

Table 2: Recommendations for drivers who have experienced seizures

Type of seizure	Private drivers	Commercial drivers
Single, unprovoked seizure before a diagnosis	<ul style="list-style-type: none"> • No driving for at least 3 months and • Neurologic assessment, preferably including EEG (awake and asleep) and appropriate imaging 	<ul style="list-style-type: none"> • No driving private vehicles for at least 3 months • Neurologic assessment, including EEG (awake and asleep) and appropriate imaging • If no epilepsy diagnosis, resume professional driving if seizure free for 12 months
After diagnosis of epilepsy	Drive if <ul style="list-style-type: none"> • 6 months seizure free* on medication • Physician has insight into patient compliance • Physician cautions against fatigue, alcohol 	<ul style="list-style-type: none"> • Resume driving if 5 years seizure free (Recommendations for individual patients may differ on an exceptional basis.)

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After surgery to prevent epileptic seizures	<ul style="list-style-type: none"> • Resume driving if 12 months seizure free after surgery with therapeutic drug levels (Recommendations for individual patients may differ on an exceptional basis.) 	<ul style="list-style-type: none"> • Resume driving if 5 years seizure free (Recommendations for individual patients may differ on an exceptional basis.)
Seizures only in asleep or immediately on waking	<ul style="list-style-type: none"> • Drive after 1 year from initial seizure if drug levels are therapeutic 	<ul style="list-style-type: none"> • No driving commercial vehicles for at least 5 years
Medication withdrawal or change:		
Initial withdrawal or change	<ul style="list-style-type: none"> • No driving for 3 months from the time medication is discontinued or changed 	<ul style="list-style-type: none"> • No driving for 6 months from the time medication is discontinued or changed
If seizures recur after withdrawal or change	<ul style="list-style-type: none"> • Resume driving if seizure free for 3 months 	<ul style="list-style-type: none"> • Resume driving if seizure free for 6 months (Recommendations for individual patients may differ on an exceptional basis.)
Long-term withdrawal and discontinuation of medication	<ul style="list-style-type: none"> • Drive any vehicle if seizure free off medication for 5 years with no epileptiform activity within previous 6 months on waking and sleep EEG 	
Auras (simple partial seizures)	Drive if: <ul style="list-style-type: none"> • Seizures are unchanged for at least 12 months • No generalized seizures • Neurologist approves • No impairment in level of consciousness or cognition • No head or eye deviation with seizures 	Drive if: <ul style="list-style-type: none"> • Seizures remain benign for at least 3 years • No generalized seizures • Neurologist approves • No impairment in level of consciousness or cognition • No head or eye deviation with seizures
Alcohol-withdrawal-induced seizures	Drive if: <ul style="list-style-type: none"> • Remain alcohol free and seizure free for 6 months • Complete a recognized rehabilitation program for substance dependence • Compliant with treatment 	
Post-traumatic seizures (single, not epilepsy)	<ul style="list-style-type: none"> • Same as for single, unprovoked seizure 	
Juvenile myoclonic epilepsy (Janz syndrome)	<ul style="list-style-type: none"> • No driving of any class of vehicle unless taking appropriate anti-seizure medication 	
<small>*Or 12 months seizure free if seizures associated with altered awareness have occurred in previous 2 years (see text). Note: EEG = electroencephalography; MRI = magnetic resonance imaging</small>		

10.4.2 After a diagnosis of epilepsy

Patients may drive any class of vehicle if they have been seizure free for 5 years with or without anticonvulsive medication. However, patients with Juvenile myoclonic epilepsy (Janz syndrome) may not drive any class of vehicle unless they are taking appropriate anti-seizure medication.

Private drivers: Patients with epilepsy who are taking anti-seizure medication should not be recommended for Class 5 or 6 licensing until the following conditions are met:

- *Seizure-free period:* The patient should be seizure free on medication for not less than 6 months, unless seizures with altered awareness have occurred more than once a year in the previous 2 years, in which case the seizure-free interval should be 12 months. With

certain types of epilepsy, this period may be reduced to not less than 3 months on the recommendation of a neurologist, stating the reasons for this recommendation. The seizure-free period is necessary to establish a drug level that prevents further seizures without side effects that could affect the patient's ability to drive safely. The anti-seizure medication should have no evident effect on alertness or muscular coordination.

- *Patient compliance with medication and instructions:* The attending physician should feel confident that the patient is conscientious and reliable and will continue to take the prescribed anti-seizure medication as directed, carefully follow the physician's instructions and promptly report any further seizures. Medication compliance and dose appropriateness should be documented with drug levels whenever reasonably possible.

Physicians should advise epileptic patients that they should not drive for long hours without rest or when fatigued. Patients who require anti-seizure medication and who are known to drink alcohol to excess should not drive until they have been alcohol and seizure free for at least 6 months. These patients often neglect to take their medication while drinking. As well, alcohol withdrawal is known to precipitate seizures and the use of even moderate amounts of alcohol may lead to greater impairment in the presence of anti-seizure medication. Patients taking these drugs should be advised not to consume more than 1 unit of alcohol per 24 hours.

A patient who stops taking anti-seizure medication against medical advice should not be recommended for driving. This prohibition on driving may change if the physician feels confident that the formerly noncompliant patient, who is again taking anti-seizure medication as prescribed, will conscientiously do so in the future and if compliance is corroborated by therapeutic drug levels, when available.

Commercial drivers: It can be unsafe for commercial drivers who must take anti-seizure medication to operate passenger-carrying or commercial transport vehicles (Classes 1–4). For these drivers, there is a need for even greater certainty that another seizure will not occur while they are driving. Commercial drivers are often unable to avoid driving for long periods of time, frequently under extremely adverse conditions or in highly stressful and fatiguing situations that could precipitate another seizure. Unfortunately, seizures do sometimes recur even after many years of successful treatment.

10.4.3 After surgery to prevent epileptic seizures

Private drivers: These patients should be seizure free for 12 months after the surgery and taking anti-seizure medication before being recommended for driving any type of motor vehicle. This period may be reduced to 6 months on the recommendation of a neurologist.

Commercial drivers: Before resuming driving, commercial drivers should be seizure free for

5 years with or without medication. However, in certain types of epilepsy, this period may be reduced to 3 years on the recommendation of a neurologist.

10.4.4 Seizures only while asleep or on wakening

Private drivers: Patients with epilepsy whose seizures have only occurred while they were asleep or immediately after wakening for at least 1 year can be recommended for a private licence (Classes 5 and 6) no less than 12 months after the initial seizure and with therapeutic drug levels.

Commercial drivers: Commercial drivers with these types of seizures and with therapeutic drug levels should not drive passenger-carrying vehicles or commercial trucks (Classes 1–4) for at least 5 years. Recommendations for individual patients may differ on an exceptional basis. There should be no prolonged postictal impairment in wakefulness.

10.4.5 Withdrawal of seizure medication or medication change

These recommendations do not apply to voluntary cessation of anti-seizure medication by the patient or missed doses of prescribed medication.

Initial withdrawal or change: Some patients with fully controlled seizures whose anti-seizure medication is withdrawn or changed have a recurrence of their seizures. Because the relapse rate with drug withdrawal is at least 30%–40%, patients must not drive for 3 months from the time their medication is discontinued or changed. Such patients should always be cautioned that they could have further seizures and counseled as to risk factors for seizure recurrence.

The same concerns and conditions apply to commercial drivers as to private drivers. However, the period of observation before resuming driving is 6 months, and a normal EEG, preferably in both wakefulness and sleep, should be obtained during this time. If the evaluation is being done in the context of medication withdrawal, the EEG should be done with non-measurable serum drug levels.

If seizures recur: When seizures recur after a physician has ordered a discontinuation of, or a change in, anti-seizure medication, patients can resume driving provided they take the previously effective medication according to the physician's instructions. Private drivers must also have been seizure free for 3 months and commercial drivers for 6 months before resuming driving.

Long-term withdrawal or discontinuation: Patients with epilepsy whose anticonvulsant medication has been discontinued can drive any class of vehicle when they have been seizure free off medication for 5 years and no epileptiform activity is recorded during a waking and sleep EEG obtained in the 6 months prior to driving.

10.4.6 Auras (simple partial seizures)

Private drivers: Patients with auras with somatosensory, special sensory symptoms or non-disabling focal motor seizures in a single limb without head or eye deviation may be eligible for a Class 5 or 6 licence provided there is no impairment in their level of consciousness and cognition, the seizures are unchanged for more than 1 year and they have the approval of a neurologist to resume driving.

Commercial drivers: Patients with auras with somatosensory, special sensory symptoms or nondisabling focal motor seizures in a single limb without head or eye deviation may be eligible to drive commercial vehicles, including passenger-carrying commercial vehicles (Classes 1–4), provided there is no impairment in their level of consciousness, the seizure pattern has remained benign for at least 3 years and has never been generalized and they have the approval of a neurologist to resume driving.

10.4.7 Seizures induced by alcohol withdrawal

As a result of chronic alcohol abuse or after a bout of heavy drinking, alcohol withdrawal can cause seizures in both epileptic and non-epileptic patients. Patients who have had alcohol withdrawal seizures should not drive any type of motor vehicle. They require investigation to exclude an underlying epileptic disorder. Before they can resume driving, these patients must complete a recognized rehabilitation program for substance dependence and remain both alcohol free and seizure free for 6 months. A non-epileptic patient who has had a seizure induced by alcohol withdrawal does not usually require anti-seizure medication.

10.5 Disorders affecting coordination, muscle strength and control

Loss of muscle strength or coordination occurs in a wide variety of disorders, each of which poses a special problem. This includes such conditions as weakness, altered muscle tone, involuntary movements or reduced coordination due to poliomyelitis, Parkinson's disease, multiple sclerosis, cerebral palsy, the muscular dystrophies, myasthenia gravis, tumours of the brain or spinal cord, spina bifida, organic brain damage following a head injury or stroke, Tourette's syndrome, Huntington's chorea and ataxias.

In the early stages of some of these conditions, no driving restrictions may be necessary. However, in serious cases, it will be immediately obvious that the applicant is unable to drive safely. Drivers with Class 5 licences, who have mild loss of muscle strength or control, may have special controls added to their cars. The motor vehicle licensing authorities are aware of the types of controls available and where they can be obtained. After the controls have been installed, the driver must undergo a road test and satisfy an examiner that he or she can drive safely.

If the disorder is not progressive, one medical examination and road test will usually suf-

fice. However, if the condition is progressive or there are multiple medical conditions, the patient must be followed closely and driving discontinued when the disability reaches a point that makes driving unsafe. In such conditions, the physician should recommend a functional evaluation if the patient wishes to resume driving.

If the condition is characterized by or accompanied by cognitive impairment, impairment of memory, judgement or behaviour or it is liable to lead to a loss of consciousness, the patient should be advised to stop driving. Any sign of cognitive impairment should trigger further evaluation of fitness to drive (see section 7.3).

In most instances, these disorders preclude holding a Class 6 licence.

10.6 Severe pain

Severe pain from such causes as a migraine headache, trigeminal neuralgia or lesions of the cervical or lumbar spine can decrease concentration or limit freedom of movement to a degree that can make driving extremely hazardous. This is a particular concern for commercial drivers whose responsibilities or working conditions may prevent them from stopping work even if the pain becomes disabling.

In addition, prescription and over-the-counter painkillers may interfere with a person's ability to drive safely. However, some patients may be rendered capable of driving despite their pain by the use of these medications. Patients who experience frequent, chronic and incapacitating pain should be advised to avoid driving while incapacitated.

The underlying condition causing the pain may affect the person's fitness to drive and a functional evaluation may be indicated.

10.7 Head injury and seizures

Drivers who have had a recent head injury should always be examined with particular care to determine whether there is any evidence of confusion or other symptoms that would make them temporarily unfit to drive. Although a minor head injury usually does not impair driving for more than a few hours, a more serious injury that results in even minimal residual brain damage or concussion should be fully evaluated before driving is resumed.

See also section 14.4, Traumatic and acquired brain injury.

10.7.1 Post-traumatic seizure

A patient with a head injury may resume driving after a single post-traumatic seizure under certain conditions.

Private drivers: A patient with a single post-traumatic seizure should not drive for at least 3 months and not until a complete neurologic evaluation, including EEG with sleep recording and appropriate brain imaging, has been carried out.

Commercial drivers: A patient with a single post-traumatic seizure should not drive for at least 12 months and not until a complete neurological evaluation, including EEG with sleep recording and appropriate brain imaging, has been carried out.

10.7.2 Post-traumatic epilepsy

The guidelines for private and commercial drivers after a diagnosis of epilepsy (section 10.4.2) should be applied to those with post-traumatic epilepsy.

10.8 Intracranial tumours

A patient who wishes to resume private or commercial driving after removal of an intracranial tumour must be evaluated regularly for recovery of neurologic function and the absence of seizure activity.

10.8.1 Benign tumours

If a patient's cognitive function, judgement, coordination, visual fields, sense of balance, motor power and reflexes are all found to be normal after the removal of a benign intracranial tumour, there is usually no reason to recommend any permanent driving restrictions.

If a seizure occurred either before or after the removal of a tumour, the patient should be seizure free for at least 12 months, with or without medication, before resuming driving.

10.8.2 Malignant tumours

No general recommendation can be made about driving after the removal of a malignant or metastatic brain tumour. The opinions of the consulting neurologist and the surgeon who removed the tumour should always be sought and each case evaluated individually. Seizures related to a brain tumour are discussed above. If there is a possibility that the tumour could recur, the physician should always fully explain to the patient the nature of the condition before sending a medical report to the motor vehicle licensing authority.