

**Progressive muscle atrophy**  
 - Progressive muscular atrophy is a lower motor neuron syndrome without upper motor neuron signs. The relation between progressive muscular atrophy and amyotrophic lateral sclerosis has been debated extensively.  
 - Some patients with progressive muscular atrophy progress fairly slowly, prompting the suggestion that the disorder is a variant of spinal muscular atrophy, a much less aggressive motor neuron disease. Other affected individuals presenting with progressive muscular atrophy eventually develop full amyotrophic lateral sclerosis.

**Primary lateral sclerosis**  
 - Primary lateral sclerosis is a pure upper motor neuron disease without lower motor neuron involvement. This entity has also been debated widely. In a review of 39 patients with primary lateral sclerosis, 16 remained free of lower motor neuron signs throughout their clinical course but 13 eventually presented with evidence of lower motor neuron involvement, suggesting that a substantial proportion of these individuals develop amyotrophic lateral sclerosis before death.

**Bulbospinal muscular atrophy**  
 - Although technically a variant of spinal muscular atrophy, bulbospinal muscular atrophy (Kennedy's syndrome)-an X-linked recessive lower motor neuron syndrome with bulbar involvement-can be confused with amyotrophic lateral sclerosis. Tongue wasting and fasciculation, gynaecomastia, testicular atrophy, and infertility are characteristic findings.

**Multifocal motor neuropathy**  
 - Multifocal motor neuropathy is an important differential diagnosis because it is potentially treatable. Weakness generally affects distal arm muscles and can be in the distribution of individual nerves. Cranial nerves and respiratory muscles are rarely affected.  
 - Upper motor neuron signs are absent and the disease can be very slowly progressive, over a period of up to 30 years.

**Disease-modifying treatments**  
 - Many putative disease-modifying strategies for amyotrophic lateral sclerosis have been tested in clinical trials but only one drug (riluzole) has so far been licensed. It prolongs the lifespan of patients with amyotrophic lateral sclerosis by an average of 3 months.

**symptomatic treatments**

	Dosage*
<b>Fasciculations and muscle cramps</b>	
Mild	
Magnesium	5 mmol up to three times a day
Vitamin E	400 IE twice a day
Severe	
Quinine sulphate	200 mg twice a day
Carbamazepine	200 mg twice a day
Phenytoin	100 mg up to three times a day
<b>Spasticity</b>	
Baclofen	10-80 mg
Tizanidine	6-24 mg
Memantine	10-60 mg
Tetrazepam	100-200 mg
<b>Drooling</b>	
Amitriptyline	10-150 mg
Transdermal hyoscine patches	1-2 patches
Glycopyrrolate	0.1-0.2 mg subcutaneously or intramuscularly three times a day
Atropine or benztropine	0.25-0.75 mg or 1-2 mg
<b>Pathological laughing or crying</b>	
Amitriptyline	10-150 mg
Fluvoxamine	100-200 mg
Lithium carbonate	400-800 mg
Levodopa	500-600 mg

Drugs are listed for every symptom in order of recommendation. \*Usual range of adult daily dose; some patients might need higher doses—eg, of antispastic drugs.

key elements include management of nocturnal hypoventilation, dysphagia, dysarthria, dyspnoea, psychosocial and palliative care; tracheostomy in the terminal phase is likely to lead to an essentially 'locked-in' state

-The course of the disorder is inexorably progressive, with 50% of patients dying within 3 years of onset.

**related conditions**

**general**

- Amyotrophic lateral sclerosis (aka motor neuron disease) is a devastating illness with uncertain pathogenesis.  
 - Amyotrophic lateral sclerosis is a progressive disorder that involves degeneration of the motor system at all levels.

**epidemiology**

- The incidence of sporadic ALS is between 1.5 and 2.0 per 100 000 population per year, giving a prevalence of around 6 per 100 000.  
 - Males are usually affected more than females (ratio about 1.6:1).

- The clinical features of amyotrophic lateral sclerosis are indicative of the loss of neurons at all levels of the motor system—from the cortex to the anterior horn of the spinal cord. Physical signs of this disorder thus encompass both upper motor neuron and lower motor neuron findings.  
 - Objective sensory findings are incompatible with a diagnosis of amyotrophic lateral sclerosis unless they can be accounted for by neurological comorbidity.  
 - The clinical features can be considered in relation to neurological regions or levels: bulbar, cervical, and lumbar.

**Bulbar-onset ALS**

- Bulbar-onset patients present with slurring of speech (dysarthria), difficulty swallowing (dysphagia), or both.  
 - Exclusion of other potentially treatable diseases is important—eg, oesophageal carcinoma and myasthenia gravis. Bulbar involvement can be lower motor neuron (bulbar palsy), upper motor neuron (pseudobulbar palsy), or both.  
 - Bulbar palsy is associated with upper and lower facial weakness and poverty of palatal movement with wasting, weakness, and fasciculation of the tongue.  
 - Pseudobulbar palsy is characterised by emotional lability (also known as pathological laughing or crying), brisk jaw jerk, and dysarthria.

**Cervical-onset ALS**

- Cervical-onset amyotrophic lateral sclerosis presents with upper-limb symptoms, either bilateral or unilateral. Proximal weakness can present as difficulty with tasks associated with shoulder abduction (eg, hair washing, combing, etc), and distal weakness can manifest with impairment of activities requiring pincer grip.  
 - Upper limb signs might also be upper motor neuron, lower motor neuron, or both. The arm can be strikingly wasted with profuse fasciculation and brisk reflexes.

**Lumbar onset ALS**

- Lumbar onset implies degeneration of the anterior-horn cells of the lumbar enlargement and is associated with lower motor neuron symptoms and signs in the legs, such as a tendency to trip (foot drop) or difficulty on stairs (proximal weakness).

**Direct (owing to motor neuronal degeneration)**

- Weakness and atrophy
- Fasciculations and muscle cramps
- Spasticity
- Dysarthria
- Dysphagia
- Dyspnoea
- Emotional lability

**Indirect (as a result of primary symptoms)**

- Psychological disturbances
- Sleep disturbances
- Constipation
- Drooling
- Thick mucous secretions
- Symptoms of chronic hypoventilation
- Pain

**motor neuron disease**  
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**clinical features**

**therapy**

**prognosis**