


Botulism is caused by:

- A. Clostridium botulinum toxin
- B. Borrelia burgdorferi
- C. Staphylococcus aureus
- D. Campylobacter jejuni

- Botulism is caused by \_\_\_\_\_.
- The toxin blocks release of acetylcholine.

Three forms of Botulism	Infant botulism → _____ Syndrome
<p>Three common forms of botulism are:</p> <p><b>Foodborne botulism:</b> The harmful bacteria thrive and produce the toxin in environments with little oxygen, such as in home-canned food.</p> <p><b>Wound botulism:</b> If these bacteria get into a cut, they can cause a dangerous infection that produces the toxin.</p> <p><b>Infant botulism:</b> This most common form of botulism begins after Clostridium botulinum bacterial spores grow in a baby's intestinal tract. It typically occurs in babies between the ages of 2 months and 8 months.</p>	

Botulism in an infant is associated with ingestion of:

- A. Mayonnaise
- B. Pasta
- C. Honey
- D. Strawberries

- Infants should never be given \_\_\_\_\_.
- Honey ingestion can lead to hypotonia ("floppy baby") syndrome in an infant because of botulinum toxins in the honey.

Pediatricians recommend waiting until your baby is at least \_\_\_\_\_ before introducing honey because it may contain spores of bacteria that can cause botulism.

- A. 3 months
- B. 12 months
- C. 36 months
- D. 48 months



Which of the following is **INCORRECT** regarding Medical Botulinum?

- A. Botulinum toxin is a neurotoxic protein produced by the bacterium *Clostridium botulinum* and related species.
- B. Botulinum toxin is also used commercially in medicine, cosmetics and research.
- C. It prevents the release of the neurotransmitter acetylcholine from axon endings at the neuromuscular junction.
- D. Botulinum toxin is used to treat flaccid paralysis.



<b>Cosmetics</b>	<ul style="list-style-type: none"> <li>Botox blocks signals from the nerves to the muscles.</li> <li>The injected muscle can no longer contract, which causes the wrinkles to relax and soften.</li> </ul>
<b>Migraine</b>	<ul style="list-style-type: none"> <li>Botox injected in head 'trigger point' shown to reduce migraine crises.</li> <li>Scientists in Spain have identified the location of the so-called trigger points that, when activated, cause migraine crises.</li> </ul>
	<ul style="list-style-type: none"> <li>This toxin can be purified and used safely and effectively to reduce spasticity in specific muscle groups.</li> <li>Botox works by blocking the chemical signal between nerves and muscles that makes the muscle contract or tighten.</li> </ul>

- Spasticity is a condition in which certain muscles are continuously contracted.
- This contraction causes stiffness or tightness of the muscles and can interfere with normal movement, speech and gait.
- Spasticity is usually caused by damage to the portion of the brain or spinal cord that controls voluntary movement.

<b>Velocity dependence</b>	<ul style="list-style-type: none"> <li>↑ tone of spasticity is _____ dependent, that is, the faster the stretch, the greater the muscle resistance</li> </ul>
<b>Clasp-knife phenomenon</b>	<ul style="list-style-type: none"> <li>Spastic limb initially resists movement and then suddenly gives way, like the resistance of a folding knife blade</li> </ul>

Parkinson's disease is characterized by which of the following tremors?

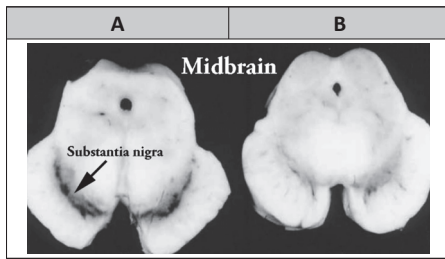
- A. Intention tremor
- B. Resting tremor
- C. Essential tremor
- D. None of the above

Normal	Parkinson's disease
<p>Substantia nigra</p> 	<p>Diminished substantia nigra as seen in Parkinson's disease</p> 

Parkinson's disease results from the death of dopamine-generating cells in the \_\_\_\_\_.

Resting tremor	Intention tremor
which occurs only at rest	occurs during voluntary movement
↓	
characteristic of Parkinson's	

Which of the following diagrams presents Parkinson's disease?



A 63-year-old male presents to the clinic complaining of a new onset tremor. The tremor is not present when he performs tasks. Upon thorough history taking he admits to micrographia. Physical examination reveals a shuffling gait. The most appropriate treatment is:

- A. amitriptyline
- B. selegiline
- C. benzotropine
- D. carbidopa-levodopa

The drug of choice for Parkinson's disease is \_\_\_\_\_ or dopamine agonists.

Levodopa	<ul style="list-style-type: none"> <li>The metabolic precursor of dopamine, does cross the blood-brain barrier, and presumably is converted to dopamine in the brain.</li> </ul>
Carbidopa	<ul style="list-style-type: none"> <li>It works by preventing levodopa from being broken down before it reaches the brain.</li> <li>This allows for a lower dose of levodopa, which causes less nausea and vomiting.</li> </ul>

Which of the following is NOT a sign/symptom of Parkinson's disease?

- A. Hyperkinesia
- B. Resting tremor
- C. Shuffling gait
- D. Mask-like face
- E. Tremor superimposed on muscular rigidity

Resting tremor	<ul style="list-style-type: none"> <li>Sometimes referred to as _____ tremor</li> <li>The most common symptom, affecting about 65% of patients</li> <li>The tremor is suppressed by activity or sleep and worsened by fatigue or stress</li> </ul>
Bradykinesia (Akinesia)	<ul style="list-style-type: none"> <li>Slowing of movements</li> <li>"_____" is a term for the loss of ability to move your muscles voluntarily.</li> </ul>
Cogwheel rigidity	<ul style="list-style-type: none"> <li>Tremor superimposed on muscular rigidity</li> </ul>
Other symptoms	<ul style="list-style-type: none"> <li>Shuffling gait, masked facies, postural instability</li> <li>Patients can have depression, dementia, and/or orthostatic hypotension.</li> </ul>

SMART		TRAP	
S	Shuffling gait	T	Tremor
M	Mask-like face	R	Rigidity
A	Akinesia	A	Akinesia
R	Rigidity	P	Postural instability
T	Tremor		

Parkinson's disease can be effectively medically treated with all of the following EXCEPT:

- A. L-Dopa
- B. Dopamine receptor agonist
- C. Dopamine receptor antagonist
- D. Anticholinergic agents

agonist	antagonist
a substance that fully activates the receptor that it binds to	a substance that binds to a receptor but does not activate and can block the activity of other agonists

#### Dopamine Receptor Antagonist

- An example of a dopamine receptor antagonist is haloperidol.
- This medication is used in movement disorders such as Huntington's disease, but has extrapyramidal and anticholinergic side effects.
- These side effects can mimic parkinsonian-like symptoms

A common side effect of anti-Parkinson drugs (e.g., Carbidopa-Levodopa, Ropinirole) is:

- A. Facial flushing
- B. Erectile dysfunction
- C. Tachycardia
- D. Postural hypotension

Carbidopa-Levodopa	Ropinirole
Sinemet®	Requip®

#### Anti-Parkinson drugs

- \_\_\_\_\_ is a common problem in many anti-Parkinson drugs.
- Postural hypotension can be treated with salt tablets or mineralocorticoids (such as fludrocortisone or midodrine).
- Other side effects of these medications include confusion and hallucinations.
- L-dopa may cause nausea, abdominal cramping, and diarrhea.

#### Orthostatic hypotension

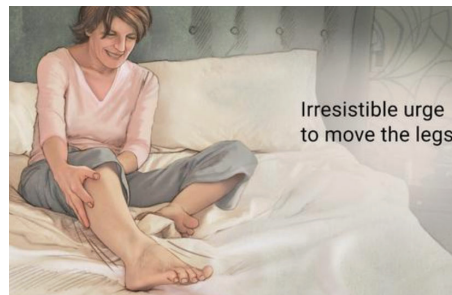
- Orthostatic hypotension, also known as postural hypotension, occurs when a person's BP falls when suddenly standing up from a lying or sitting position.
- Orthostatic hypotension is a physical finding defined as a systolic BP decrease of at least \_\_\_\_\_ mmHg or a diastolic BP decrease of at least 10 mmHg within three minutes of standing.
- Severe drops in blood pressure can lead to fainting, with a possibility of injury.

Patients with this particular syndrome report a strong, sometimes irresistible urge to move their legs:

- A. Restless leg syndrome (RLS)
- B. Cerebral palsy (CP)
- C. Amyotrophic lateral sclerosis (ALS)
- D. Spinal muscular atrophy (SMA)

- \_\_\_\_\_ sensations are sometimes compared to an itching or tickling in the muscles, which temporarily subside with movement of the affected extremities.

Restless Leg Syndrome	Sciatica
Get worse during sleep and then better during the day	Doesn't get worse during sleep and then better during the daytime
Not worsened by movement	Worsens from moving, coughing, bending, exercising or sneezing



A 65-year-old woman presents to the office with a complaint of difficulty sleeping. History reveals that when she lies down at night, she feels uncomfortable and a persistent urge to move her lower extremities to relieve the discomfort. Physical examination is unremarkable. The most appropriate management for this patient is

- A. Ropinirole (Requip) + Vitamin C
- B. Ropinirole (Requip) + Iron supplement
- C. Ropinirole (Requip) + Vitamin D
- D. Ropinirole (Requip) + Potassium supplement

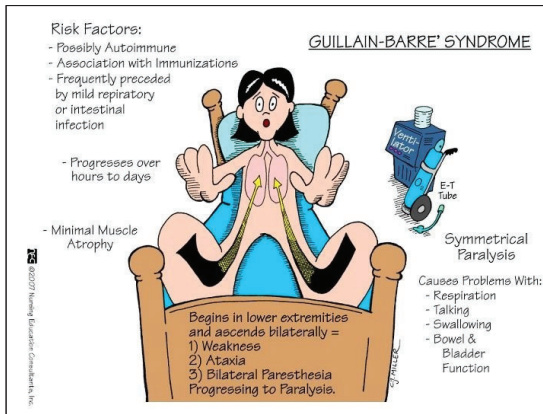
#### Restless Leg Syndrome

- RLS presents with a discomfort in the legs that is relieved with movement and exacerbated by rest (especially at night).
- The neurological exam is normal with RLS.
- Polysomnography may show periodic limb movements during sleep.
- RLS is most often idiopathic, however it can be secondary to a general medical condition (the most common one is \_\_\_\_\_ deficiency) or due to a drug side effect.
- Secondary causes to keep in mind are opiate withdrawal, dopamine blocking medications, pregnancy, and obstructive sleep apnea.

Which of the following can trigger Guillain-Barré syndrome (GBS)?

- A. Respiratory viral infection
- B. Gastrointestinal viral infection
- C. Vaccinations
- D. All of the above

- GBS is believed to be caused by \_\_\_\_\_ or a viral attack on the myelin and Schwann cells.
- Initial symptoms will include weakness and tingling sensation in the legs and can progress to almost total paralysis.



- Guillain-Barre syndrome is characterized by \_\_\_\_\_ paralysis and parasthesias along with depressed deep tendon reflexes, facial weakness, and dysautonomia.
- Diagnosis is confirmed with lumbar puncture revealing elevated CSF protein and normal WBC count (albuminocytologic dissociation), electromyography, and nerve conduction tests.
- While rare today, GBS has been associated with influenza vaccination.
- Treatment of choice for GBS is plasmapheresis or IVIG.

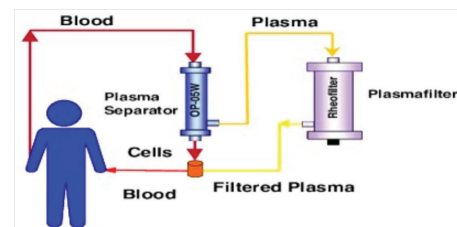
A patient receives an influenza vaccination and returns 2 weeks later complaining of parasthesias and weakness in the lower extremities that have been progressively moving cephalad. Physical examination reveals tachycardia and absent Achilles and patellar deep tendon reflexes.

Most likely diagnosis is:

- A. Restless leg syndrome
- B. Cerebrovascular accident
- C. Guillain-Barre syndrome
- D. Multiple sclerosis

The most appropriate management is:

- A. plasmapheresis
- B. prednisone
- C. acyclovir
- D. diphenhydramine hydrochloride



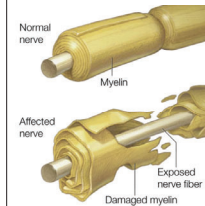
	<ul style="list-style-type: none"> <li>• A process that filters the blood and removes harmful antibodies.</li> <li>• It is a procedure done similarly to dialysis; however, it specifically removes antibodies from the plasma portion of the blood.</li> </ul>
IVIG	<ul style="list-style-type: none"> <li>• Intravenous Immunoglobulin (IVIG) is a solution of highly purified immunoglobulin G, derived from large pools of human plasma that contain antibodies against a broad spectrum of bacterial and viral agents.</li> </ul>

A 27-year-old female presents with paresthesias and slight muscle weakness that started in the lower extremities. It is progressively ascending to her upper extremities and face. The patient is afebrile and areflexic. Which of the following is the most common preceding infection?

- A. *Campylobacter jejuni*
- B. *Haemophilus influenzae*
- C. Varicella-zoster virus
- D. Cytomegalovirus
- E. *Mycoplasma pneumoniae*

#### Guillain-Barre Syndrome (GBS)

- Progressive, ascending neuropathy is the hallmark of GBS.
- Back pain, difficulty chewing and speaking are often present.
- Patients with intact deep tendon reflexes should be re-evaluated for something other than GBS.
- The progression of weakness usually lasts less than 4 weeks followed by stabilization and improvement of the weakness.
- GBS is commonly preceded by infection of the respiratory or GI tract.
- Spinal tap will reveal increases CSF protein.
- \_\_\_\_\_ is the most common infection leading to GBS.



#### *Campylobacter jejuni*

- Bacteria (rod shaped, flagellate, gram negative)
- One of the most common causes of food poisoning in Europe and in The United States
- loves to hang around in feces, especially in poultry (chickens, turkeys, ducks) → All poultry should be cooked to reach a minimum internal temperature of 165 °F (74 °C).
- Treatment: hydration, maintenance of electrolyte balance, self-limited (most cases don't require antibiotics therapy.)

