

## Neurocardionegetic Syncope (NCS) - also known as Vasovagal Syncope or Reflex Syncope

- Typically recurrent
- Usually occur when the predisposed person is exposed to a specific trigger
- Usually occurs when a person is sitting up or standing
- Prognosis
  - Brief periods of unconsciousness do no harm and are seldom symptoms of disease
  - The main danger of vasovagal syncope is the risk of injury by falling while unconscious
- Early signs or symptoms
  - lightheadedness
  - nausea
  - feeling of being extremely hot or cold
  - sweating
  - ringing in the ears
  - uncomfortable feeling in the heart
  - fuzzy thoughts, confusion
  - slight inability to speak or form words, stuttering
  - weakness and visual disturbances
- Fainting occurs with a loss of oxygen to the brain
  - When a person loses consciousness, they fall down (unless prevented from doing so) and, when in this position, blood flow to the brain is immediately restored, allowing the person to regain consciousness.
  - If the person does not fall into a fully flat, supine position, and the head remains elevated above the trunk, a state similar to a seizure may result from the blood's inability to return quickly to the brain, and the neurons in the body will fire off and generally cause muscles to twitch very slightly but mostly remain very tense.
  - Loss of consciousness may persist for several minutes
- After fainting
  - **If a person tries to sit or stand when they wake up, they may pass out again**
  - A person may be nauseated, pale, and sweaty for several minutes or hours
- Triggers
  - Prolonged standing
  - Emotional stress
  - Pain
  - Sight of blood
- Diagnosis
  - After a loss of consciousness a physician will make a differential diagnosis to determine etiology. Considerations include age, pre-existing conditions, family history, physical exam, diagnostics, and details of the syncopal event.
  - In persons with recurrent vasovagal syncope the following diagnostic tests may be helpful
    - Tilt table test
    - Implantation of an insertable loop recorder
    - Holter monitor or event monitor
    - Echocardiogram
    - Electrophysiology study
  - Differential diagnosis includes:
    - Cardiac
      - Arrhythmia

- Cardiomyopathy
  - Structural Disease
- Neurally Mediated Syncope (NMS) or Reflex Syncope
  - Neurally mediated syncope is a disorder of the autonomic nervous system's regulation of postural tone, resulting in hypotension (low blood pressure), bradycardia (slow heart rate), and loss of consciousness.
  - Types include:
    - Carotid Sinus Syndrome
    - Situational
      - Related to exercise, urination/bowel movement, phobias, diet
    - Vasovagal
      - Related to stress, fear, pain, heat
- Neurologic
  - Stroke
  - Psychogenic
    - Anxiety, depression, panic disorders, somatization
- Orthostatic
  - Drug or alcohol
  - Primary autonomic (ex. Parkinson's, Multiple Sclerosis)
  - Secondary autonomic (ex. Diabetes)
  - Volume depletion (ex. Vomiting, Diarrhea, Blood Loss)
- Treatment
  - Lifestyle changes to avoid triggers
  - Medication depending etiology
- **Brief primer on Autonomic Nervous System (ANS)** (yes, mostly from [Wikipedia](#)...but that's OK)
  - The autonomic nervous system (ANS) is a division of the peripheral nervous system (versus the central nervous system - the brain and spinal cord) that supplies the nerves to smooth muscle and parts of the internal organs.
  - The ANS is a control system that acts largely unconsciously and regulates bodily functions such as the heart rate, digestion, respiratory rate, pupillary response, urination, and sexual arousal.
  - This is the system that controls the fight-or-flight response.
  - Within the brain, the autonomic nervous system is regulated by the hypothalamus.
    - Autonomic functions include control of respiration, cardiac regulation (the cardiac control center), vasomotor activity (the vasomotor center), and certain reflex actions such as coughing, sneezing, swallowing and vomiting.
  - The autonomic nervous system has three branches: the sympathetic nervous system, the parasympathetic nervous system and the enteric nervous system
    - The sympathetic nervous system is the "fight or flight" system
    - The parasympathetic nervous system is often considered the "rest and digest" or "feed and breed" system.
    - An older simplification of the sympathetic and parasympathetic nervous systems as "excitatory" and "inhibitory" was overturned due to the many exceptions found. A more modern characterization is that the sympathetic nervous system is a "quick response mobilizing system" and the parasympathetic is a "more slowly activated dampening system", but even this has exceptions, such as in sexual arousal and orgasm, wherein both play a role.
  - Most autonomous functions are involuntary but they can often work in conjunction with the somatic nervous system which provides voluntary control.

- Sympathetic Nervous System (a division of the ANS)
  - Promotes a fight-or-flight response, corresponds with arousal and energy generation, and inhibits digestion
  - Diverts blood flow away from the gastrointestinal tract and skin via vasoconstriction
  - Blood flow to skeletal muscles and the lungs is enhanced (by as much as 1200% in the case of skeletal muscles)
  - Dilates bronchioles of the lung through circulating epinephrine, which allows for greater alveolar oxygen exchange
  - Increases heart rate and the contractility of cardiac cells (myocytes), thereby providing a mechanism for enhanced blood flow to skeletal muscles
  - Dilates pupils and relaxes the ciliary muscle to the lens, allowing more light to enter the eye and enhances far vision
  - Provides vasodilation for the coronary vessels of the heart
  - Constricts all the intestinal sphincters and the urinary sphincter
  - Inhibits peristalsis (gastric motility)
  - Stimulates orgasm
- Parasympathetic nervous system
  - Promotes calming of the nerves return to regular function, and enhancing digestion
  - Dilating blood vessels leading to the GI tract, increasing the blood flow.
  - Constricting the bronchiolar diameter when the need for oxygen has diminished
  - Dedicated cardiac branches of the vagus and thoracic spinal accessory nerves impart parasympathetic control of the heart (myocardium)
  - Constriction of the pupil and contraction of the ciliary muscles, facilitating accommodation and allowing for closer vision
  - Stimulating salivary gland secretion, and accelerates peristalsis, mediating digestion of food and, indirectly, the absorption of nutrients
  - Sexual. Nerves of the peripheral nervous system are involved in the erection of genital tissues via the pelvic splanchnic nerves 2–4. They are also responsible for stimulating sexual arousal.
- Neurotransmitters regulating the ANS
  - noradrenaline (norepinephrine)
  - Acetylcholine
  - Adrenaline (epinephrine) - Stimulation of the adrenal medulla releases adrenaline (epinephrine) into the bloodstream