Nitric Oxide (NO)
- Used as an anesthetic during dental and surgical procedures
- Used as a recreational drug known as “whippets” via inhalation of whipped cream cannister
- Imparts feelings of relaxation, euphoria, and calmness

Impact of NO on vitamin B12
- NO converts B12 from active monovalent form to inactive bivalent form:
  - Leading to inhibition of DNA, RNA, myelin, and catecholamines
  - Resulting is subacute combined degeneration (SACD)
- Normal B12 levels surreptitiously mask B12 inactivation
- This highlights importance of social history and specific lab workup in diagnosis of SACD

Relevant labs
- B12 level: 249 pg/mL (low-normal level)
- Methylmalonic acid: > 4000 (elevated)
- Normocytic anemia, Hb 11.5

Further Workup
- LP showed unremarkable CSF
- NCS/EMG showed evidence of length dependent peripheral neuropathy
- MRI of cervical/thoracic spine showed findings consistent with subacute combined degeneration with normal brain and lumbar spine MRI findings.

Case Resolution
- The diagnosis if SACD due to NO inhalation was made & she was treated with 1000 mcg of IM B12 for 4 weeks and improved significantly
- Received 50mg naltrexone daily for cravings

Impact of Chronic NO use
- Causes polyneuropathy and myelopathy
- NO oxidizes cobalt ion of B12, blocking formation of methyl cobalamain, which is essential for formation of methionine and S-adenosylmethionine (SAMe)
- Methionine and SAMe methylate phospholipids within the myelin sheath
- Accumulation of methanolate and abnormal fatty acids results in dysfunction of myelin

Clinical Pearls
- Normal B12 levels in patients with suspected subacute combined degeneration requires further workup including:
  - Thorough social history (i.e. inhalant abuse)
  - Ordering methylmalonic acid and homocysteine tests as elevated levels can indicate non-functioning B12.

REFERENCES