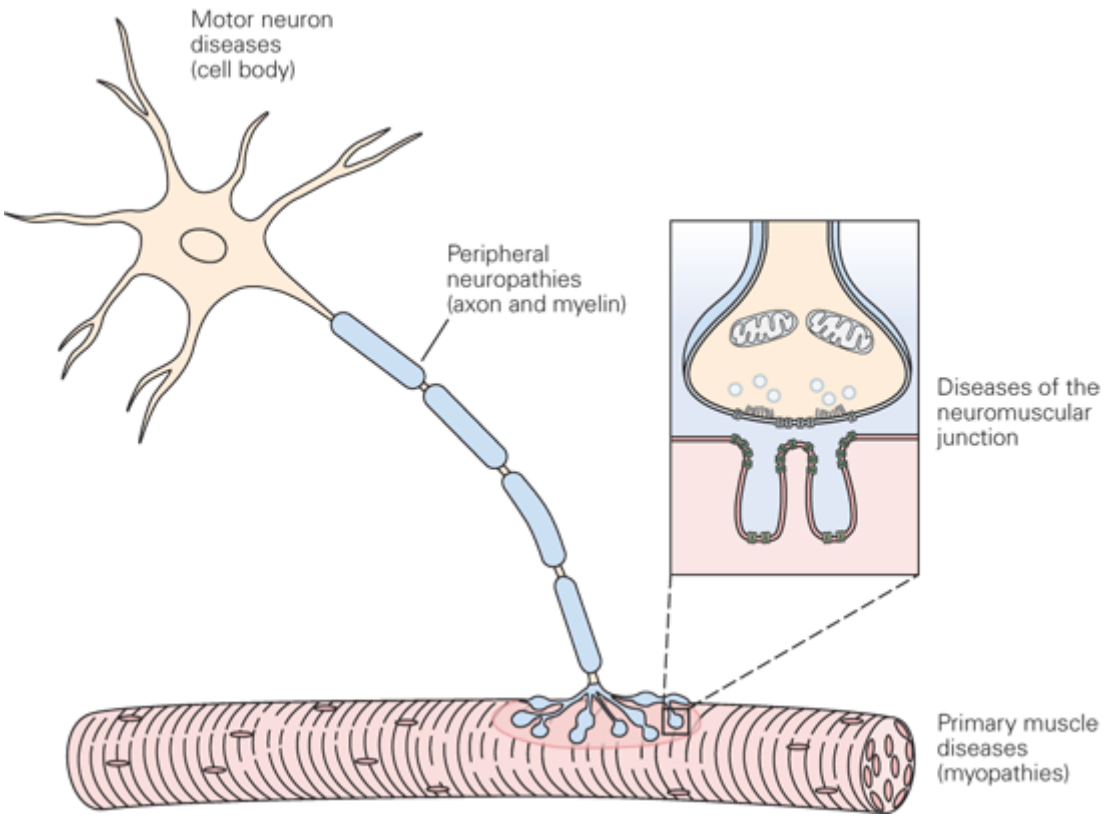
Safe use of medicines in the post-Polio setting

Chris Cameron MB ChB, FRACP

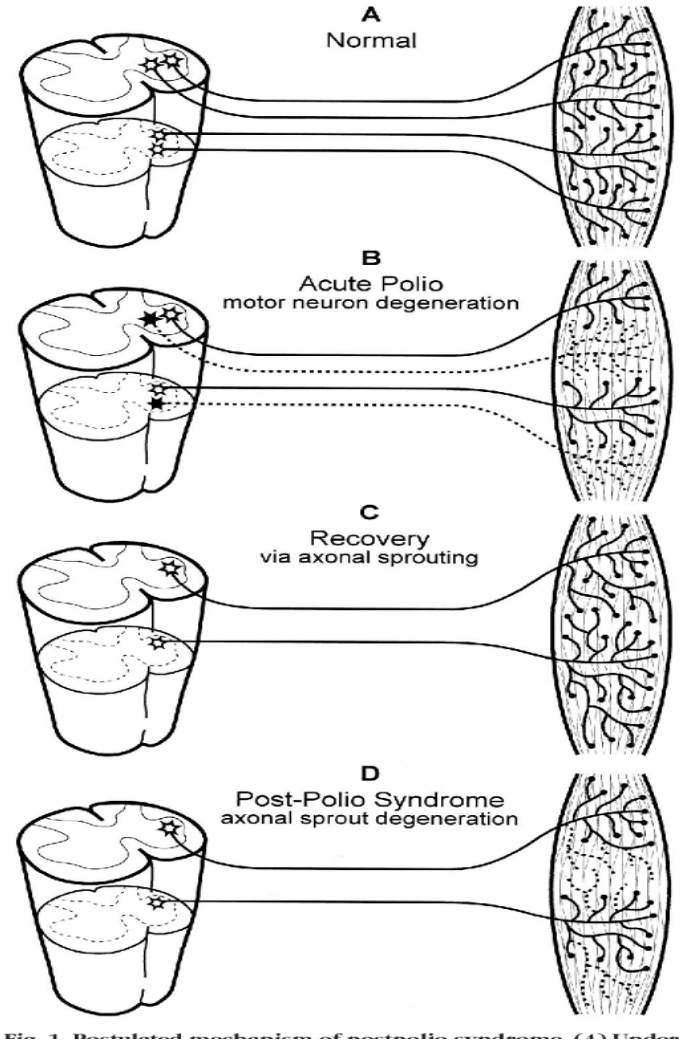
General Physician & Clinical Pharmacologist, CCDHB

Polio mainly affects the motor unit (SC) & brainstem



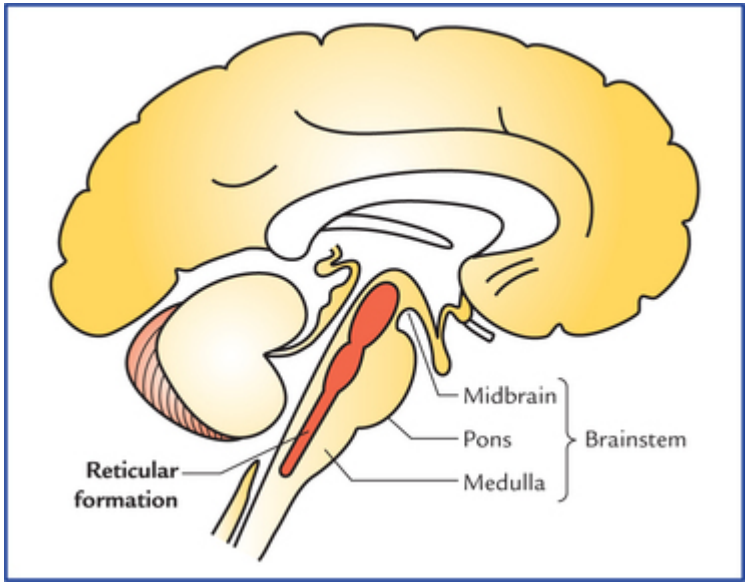
A motor unit is formed by a nerve cell (or motor neuron) in the spinal cord or brain stem and the muscle fibres it activates.

Post-polio syndrome



PPS can affect different parts of the BS & SC

- Reticular Activating System
- The RAS is responsible for consciousness

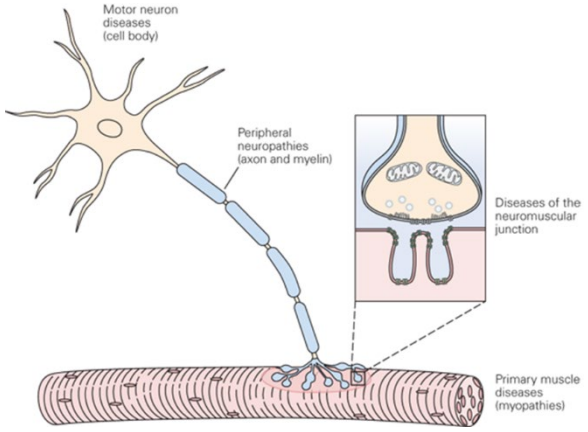


Drugs affecting the RAS

- General Anaesthetics
- Can→ prolonged emergence from GA
- Sedative medication
  - Hypnotics, antihistamines, anxiolytics, alcohol
- Opioids
- Patients with PPS who take these medications may experience an increase in polio-related weakness and fatigue

Drugs affecting the motor unit

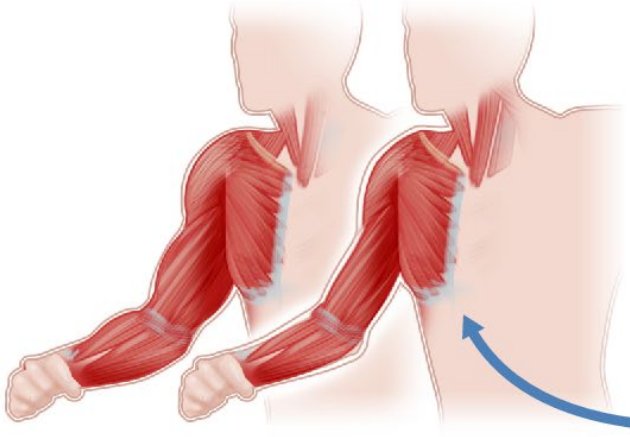
- Can affect the peripheral nerve
- Can affect the NMJ
- Can affect the muscle
- All will worsen PPS



Drugs that cause motor (or predominantly motor) peripheral neuropathy[1]	
Dapsone	
Imipramine	
Sulfonamides (some)	
Drugs that can impair neuromuscular transmission	
ACTH	Penicillamine
Aminoglycoside antibiotics	Phenothiazines
β-Blockers	Phenytoin
Chloroquine	Polymyxin
Colistin	Procainamide
Corticosteroids	Quinidine, quinine
Lithium	Tetracycline
Magnesium-containing cathartics	
Drugs associated with myopathy	
β-Blockers	ε-Aminocaproic acid
Chloroquine	HMG-CoA reductase inhibitors
Clofibrate	Penicillamine
Corticosteroids	Zidovudine
Drugs causing hypokalemia	
Emetine	

[1] A number of drugs cause mixed sensory and motor neuropathies (see Table 10-2).

Long-term alcohol excess

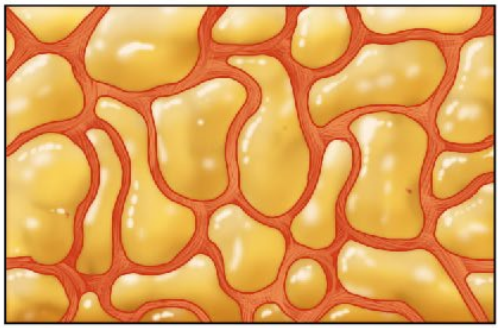


Clinical consequences of alcohol's effects on musculoskeletal and adipose tissue:

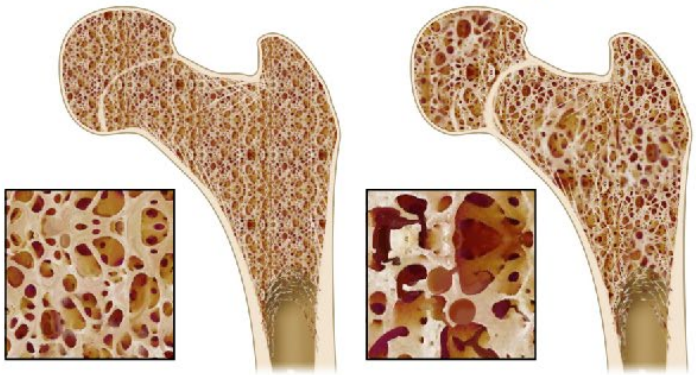
- Alcoholic myopathy
- Osteoporosis
- Metabolic syndrome
- Insulin resistance
- ↑ Fracture risk

ALCOHOL

↓ Anabolic signaling
↑ Proteosomal degradation
↓ Protein synthesis
↑ Oxidative stress
↑ Inflammation
↑ Myostatin

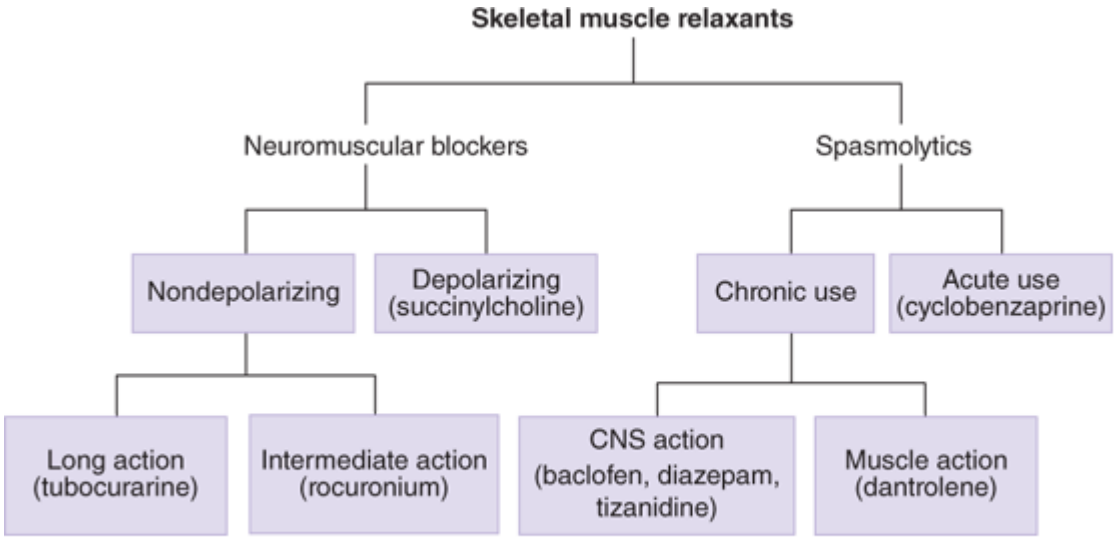


Δ Fat mass
Dyslipidemia
Δ Leptin and adiponectin



Δ Bone metabolism
↓ Mineral density and mass
↑ Inflammation
↓ Osteogenesis

Muscle relaxants in GA



Source: A.J. Trevor, B.G. Katzung, M. Kruidering-Hall: Katzung & Trevor's Pharmacology: Examination & Board Review, 11th Ed.
www.accesspharmacy.com

General Anaesthesia in PPS

- Can be a “double whammy” – GA & MR
- Non-depolarizing muscle relaxants (eg curoniums) cause a greater degree of block for a longer period of time in PPS patients. Overdose has been a frequent problem.
- The current recommendation is to start with half the usual dose, and increase if needed
- Non-depolarising muscle relaxants can cause pain post-op and should be avoided.
- Also, many patients have a significant decrease in total muscle mass.

Summary

- The BS and the motor unit are important sites for drug action
- In PPS patients these areas are functionally different
- There is often increased sensitivity to drugs that work in these areas
- Always tell the prescriber or pharmacist that you have PPS, and maybe check that they understand the significance!