1. Muscle Spasms
   * Involuntary contraction of a muscle or muscle group
   * Causes pain and decreased function
   * Causes may be epilepsy, hypocalcemia, acute and chronic pain syndromes, trauma
   * Drug therapy- may include analgesic anti-inflammatory agents, (e.g. aspirin), and centrally acting muscle relaxants.

* Agents- Centrally Acting Muscle Relaxants
* Baclofen (Lioresal)
* Diazepam (Valium)
* Carisoprodol (Soma)
* Chlorphenesin (Maolate)
* Chlorzoxazone (Paraflex, Parafon Forte, Remular-S)
* Cyclobenzaprine (Flexeril)
* Medaxalone (Skelaxin)
* Methocarbamol (Robaxin)
* Orphenadrine (Norflex)
* Tizanidine (Zanaflex)

1. Mechanism of Action for Centrally Acting Muscle Relaxants
   * Mechanism uncertain, but probably from sedative properties
   * Has no direct effect on skeletal muscle
   * Diazepam and tizanidine enhance presynaptic inhibition of motor neurons in CNS
   * Enhancing effects of GABA (gamma-aminobutyric acid), an inhibitory neurotransmitter
   * Baclofen suppresses hyperactive reflexes in spinal cord (possibly by mimicking the actions of GABA on spinal neurons)
2. Therapeutic Uses

* Treats localized spasm
* Decreases pain
* Increases ROM (Range of Motion)
* Reduces spasticity from multiple sclerosis, spinal cord injury, and cerebral palsy, but not stroke, Parkinson’s disease, or Huntington’s chorea

1. Adverse Effects
   * CNS depression (drowsiness, dizziness, lightheadedness)
   * Potential liver damage
   * Physical dependence
   * Baclofen side effects: nausea, constipation, urinary retention
   * Cyclobenzaprine and orphenadrine- Atropine-like effects (dry mouth, blurred vision, photophobia, urinary retention, constipation)
   * Tizanidine- dry mouth, hypotension, hallucinations, and psychotic symptoms
   * Metocarbamol- urine discoloration (brown, black, or dark green)
   * Chlorzoxazone- causes hepatic necrosis and should not be used
   * Diazepam- potential for fetal harm during pregnancy, especially during the first trimester. Readily enters breastmilk, increasing to toxicity in infant
2. Patient Teaching Needed

* Avoid hazardous activities if significant CNS impairment occurs
* Avoid alcohol or other CNS depressants (prevent intensified depressant effects)
* Abrupt withdrawal can cause hallucinations, paranoid ideation, and seizures. When discontinued, withdraw gradually.
* Warn women of childbearing years about potential for fetal harm if they become pregnant while taking diazepam (a benzodiazepine). If pregnancy occurs, drug should be withdrawn.
* Discourage women from breastfeeding while on diazepam

1. Medication Administration

* Usually oral route
* IV or IM route possible for methocarbamol or diazepam
* Baclofen may be administered by intrathecal infusion using implantable pump, if needed
* Diazepam may be given with food if gastric upset occurs. May be given rectally for treatment of seizures.

1. Agents- Direct Acting Muscle Relaxants

* Spasticity is movement disorder with heightened muscle tone, spasm, and loss of dexterity
* Usually combined with physical therapy
* Dantrolene (Dantrium)- promotes muscle relaxation by acting directly on skeletal muscle

1. Mechanism of Action for Direct Acting Muscle Relaxants

* Relieves spasm by suppressing release of calcium from the sarcoplasmic reticulum (SR) so skeletal muscles are less able to contract
* Therapeutic doses have minimal effects on smooth muscle or cardiac muscle

1. Therapeutic Uses

* Treats spasticity from multiple sclerosis, cerebral palsy, spinal cord injury, or stroke
* Treats malignant hyperthermia, a rare, life-threatening syndrome from anesthesia or succinycholine, a neuromuscular blocking agent

1. Adverse Effects

* Decreases strength, and may reduce overall function
* Liver damage- contraindicated with active hepatic disease (cirrhosis, hepatitis). Use lowest effective dosage for shortest time necessary
* Muscle weakness, drowsiness, diarrhea, anorexia, nausea, vomiting, acne-like rash

1. Patient Teaching Needed

* Signs of liver dysfunction (jaundice, abdominal pain, malaise)
* Need liver function tests before initiating treatment and periodically
* Monitor for reduction in muscle strength
* Avoid hazardous activities if significant depressant effects occur
* Avoid CNS depressants

1. Medication Administration

* If no beneficial effects within 45 days, drug should be withdrawn
* Usually oral dosing. May be given IV push when treating Malignant Hyperthermia crisis
* For prevention of Malignant Hyperthermia prior to surgical anesthesia, give dantrolene 1-2 days prior to surgery

1. Therapeutic Goal

* Relief of signs and symptoms of muscle spasm and spasticity

Lehne, R. A. (2004). Drugs for muscle spasm and spasticity. In R. Carter & L. Henderson (Eds.). Pharmacology for nursing care (pp. 209-213). St. Louis: Saunders.