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# Introduction to Clinical Pharmacology

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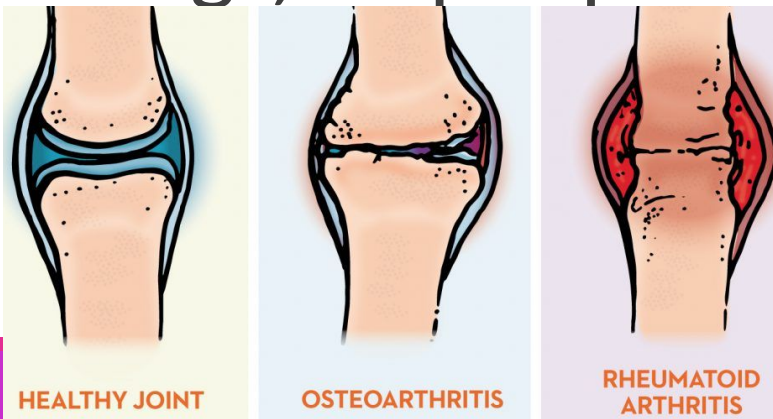
## Chapter 29 Skeletal Muscle, Bone, and Joint Disorder Drugs

# Overview-Introduction

Variety of drugs used for musculoskeletal injuries & disorders.

Acute and Chronic conditions

Skeletal muscle relaxants along with exercise and physical therapy other medications used could be disease modifying antirheumatic drugs, bisphosphonates, uric acid inhibitors



# Skeletal Muscle Relaxants

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## Actions:

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- Action is not clearly understood but thought that the sedative action maybe how they work
- Cyclobenzaprine-effect on muscle tone helping with muscle spasms
- Diazepam-thought the sedative effect helps with muscle spasms and pain

# Skeletal Muscle Relaxants

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## Uses:

- Used in various acute painful musculoskeletal conditions like strains and back pain

## Adverse reactions:

- Drowsiness most common reaction
- With diazepam also include sedation, sleepiness, lethargy, constipation or diarrhea, brady or tachycardia and possible rash

# Skeletal Muscle Relaxants

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## Contraindications:

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- Baclofen-in skeletal muscles spasms due to rheumatic disorders
- Cyclobenzaprine-in recent MI, cardiac conduction disorders, hyperthyroidism, or within 14 days of taking MAOI

## Precautions:

History of CVA, cerebral palsy, parkinsonism, or seizure disorders and during pregnancy and lactation; Cyclobenzaprine with CV disorders

# Skeletal Muscle Relaxants: Precautions

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## Precautions:

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- Carisoprodol: used with caution in patients with severe liver or kidney disease and during pregnancy and lactation
- Cyclobenzaprine: used cautiously in patients with cardiovascular disease and during pregnancy and lactation
- Dantrolene—a pregnancy category C drug: used with caution during pregnancy

# Skeletal Muscle Relaxants

## Interactions:

- Central nervous system (CNS) depressants, such as alcohol, antihistamines, opiates, and sedatives
- Cyclobenzaprine-MAOIs-fever & convulsions
- Orphenadrine-Haloperidol-Increased psychosis
- Tizanidine-antihypertensives-possible hypotension

# Skeletal Muscle Relaxants

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## Interactions:

- Postsurgical client review operative record, drugs can used to relax muscles tone for instance during anesthesia induction
- Used in abdominal or chest surgery allowing easier movement of joints and limbs
- Review Table 29.1-Examples of Muscle Relaxants Used for Surgical Procedures

# DMARDs: Uses and Adverse Reactions

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Rheumatoid Arthritis-autoimmune disorder; joints, causing swelling, pain, and inflammation

Treated with nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids, and DMARDs. Action-can no longer be controlled by pain meds and anti-inflammatory drugs will follow with DMARDs

# DMARDs: Uses and Adverse Reactions

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## Uses:

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- Rheumatoid arthritis treatment: DMARDs are useful for their immunosuppressive ability
- Cancer therapy-methotrexate; Crohn disease and fibromyalgia
- Biologic DMARDs-suppress body's natural immune response-Enbrel, Humira, Remicade, Cimzia, Simponi

# DMARDs: Uses and Adverse Reactions

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## Uses:

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- Cytotoxic drugs-Imuran, Cytoxan, cyclosporine, gold salts can be extremely toxic and reserved for life threatening problems

## Adverse reactions:

- Nausea, stomatitis, alopecia
- Sulfa-based drugs: ocular changes, GI upset, and mild pancytopenia
- Skin irritation is possible if injections given

# DMARDs: Contraindications

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## Contraindications:

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- In patients with known hypersensitivity to the drugs
- Methotrexate: contraindicated in patients with renal insufficiency, liver disease, alcohol abuse, pancytopenia, or folate deficiency
- Etanercept, adalimumab, and infliximab: should not be used in patients with congestive heart failure or neurologic demyelinating diseases

# DMARDs: Precautions and Interactions

❖ Precautions: in patients with obesity, diabetes, and hepatitis B or C; women should not become pregnant; sexual partners should use barrier contraception to prevent transmission of the drug via semen

❖ Interactions:

Interacting drug	Effect of interaction
Sulfa antibiotics	Increased risk of methotrexate toxicity
Aspirin and NSAIDs	Increased risk of methotrexate toxicity

# Bone Resorption Inhibitors: Bisphosphonates: Actions and Uses

## Actions:

- Act primarily on bone by inhibiting normal and abnormal bone resorption

## Uses:

- Osteoporosis in postmenopausal women and men
- Hypercalcemia of malignant diseases
- Paget disease of the bone



# Bone Resorption Inhibitors: Bisphosphonates: Adverse Reactions, Contraindications, and Precautions #1

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## Adverse reactions:

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- Nausea, diarrhea, increased or recurrent bone pain, headache, dyspepsia, acid regurgitation, dysphagia, abdominal pain



## Contraindications and precautions:

- Contraindicated in patients who are hypersensitive to the bisphosphonates

# Bone Resorption Inhibitors: Bisphosphonates: Adverse Reactions, Contraindications, and Precautions #2

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- Alendronate, risedronate: contraindicated in patients with hypocalcemia, during pregnancy
- Bisphosphonates: contraindicated in patients with delayed esophageal emptying or renal impairment
- Prolia-associated with hypokalemia, osteonecrosis of the jaw, infection, skin reactions, and atypical femoral fractures
- Risk Evaluation and Mitigation Strategy (REMS). monitors unusual adverse reactions

# Bone Resorption Inhibitors: Bisphosphonates: Interactions

Interacting drug	Effect of interaction
Calcium supplements or antacids, with magnesium and aluminum	Decreased effectiveness of bisphosphonates
Aspirin	Increased risk of GI bleeding
Theophylline	Increased risk of theophylline toxicity

# Uric Acid Inhibitors: Uses and Adverse Reactions

Gout-serum uric acid elevated

Actions:

- Allopurinol-reduces the production of uric acid; Febuxostat-reduce serum uric acid levels; colchicine-unknown, but reduces inflammation with deposits of uric acid
- pegloticase given IV; Probenecid decrease amount of uric acid in the body



# Uric Acid Inhibitors: Uses and Adverse Reactions

## Uses:

- To manage acute attacks of gout; prevent acute attacks of gout

## Adverse reactions:

- Gastrointestinal reactions: nausea, vomiting, diarrhea, abdominal pain
- Other reactions: headache, urinary frequency
- Allopurinol-skin rash or SJS



# Uric Acid Inhibitors: Contraindications

Contraindications: patients with known hypersensitivity

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- Sulfapyridine: patients with peptic ulcer disease and GI inflammation
- Colchicine: patients with serious GI, renal, hepatic, and cardiac disorders and those with blood dyscrasias
- Probenecid: contraindicated in patients with blood dyscrasias and uric acid kidney stones and in children younger than 2 years

# Uric Acid Inhibitors: Precautions

Precautions: patients with renal impairment and during pregnancy

- Allopurinol: used cautiously in patients with liver impairment
- Probenecid: used cautiously in patients who are hypersensitive to sulfa drugs or patients who have peptic ulcer disease
- Colchicine: used with caution in older adults

# Uric Acid Inhibitors: Interactions #1

## ❖ Interactions: allopurinol

<b>Interacting drug</b>	<b>Effect of interaction</b>
Ampicillin	Increased risk of rash
Theophylline	Increased risk of theophylline toxicity
Aluminum-based antacids	Decreased effectiveness of allopurinol

# Uric Acid Inhibitors: Interactions #2

## ❖ Interactions: probenecid

Interacting drug	Effect of interaction
Penicillins, cephalosporins, acyclovir, rifampin, and the sulfonamides	Increased serum level of anti-infective
Barbiturates and benzodiazepines	Increased serum level of sedative
NSAIDs	Increased serum level of NSAID
Salicylates	Decreased effectiveness of probenecid

# Nursing Process: Assessment #1

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## Preadministration assessment:

- Obtain patient's history: summary of the disorder, including onset, symptoms, and current treatment or therapy
- Examine affected joints in the extremities for appearance of the skin over the joint, evidence of joint deformity, and mobility of the affected joint if the patient has arthritis

# Nursing Process: Assessment #2

## Preadministration assessment (cont.)

- Patient with gout: examine the affected joints and note the appearance of the skin over the joints and any joint enlargement
- Osteoporosis: assess for pain in upper and lower back or hip



# Nursing Process: Assessment #3

## Ongoing assessment:

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- Inspect the joints involved every 1 to 2 hours to identify immediately a response or nonresponse to therapy
- Question the patients regarding relief of pain, adverse drug reactions
- Closely observe the patient for the development of adverse reactions



# Nursing Diagnoses

**Readiness for Enhanced Fluid Balance** related to need for increased fluid intake to promote excretion of urate crystals

**Impaired Comfort: Gastric Distress** related to irritation of gastric lining from medication administration

**Risk for Injury** related to medication-induced drowsiness and associated risk for imbalance and falls

**Risk for Allergy Response** related to response to substance trigger (drug allergy)

# Nursing Process: Planning

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The expected outcome includes:

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- Optimal response to therapy
- Support of patient needs related to the management of adverse reactions
- Understanding of and compliance with the prescribed therapeutic regimen

Expected outcome: depends on reason for the drug therapy

# Nursing Process: Implementation #1

Promoting an optimal response to therapy:

- Be alert to reactions such as skin rash, fever, cough, or easy bruising
- Be attentive to specific patient complaints such as visual changes, tinnitus, or hearing loss
- Evaluate any complaint or comment made by the patient and report it to the primary health care provider



# Nursing Process: Implementation #2

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## Promoting an optimal response to therapy (cont.)

- Observe closely for development of adverse reactions, such as thrombocytopenia and leukopenia
- Immediately bring all adverse reactions or suspected adverse reactions to the attention of the primary health care provider

# Nursing Process: Implementation #3

## Monitoring and managing patient needs:

- Readiness for enhanced fluid balance:
  - Encourage a liberal fluid intake and measure the intake and output
- Impaired comfort: gastric distress
  - Administer the drug with 6 to 8 oz of water while the patient is in an upright position



# Nursing Process: Implementation #4

## Monitoring and managing patient needs (cont.)

- Impaired comfort: gastric distress (cont.)
  - Check the dosage and frequency carefully to prevent drug administration errors
  - Administer DMARDs, uric acid inhibitors, and skeletal muscle relaxants with or immediately after meals to minimize gastric distress

# Nursing Process: Implementation #5

## Monitoring and managing patient needs (cont.)

- Risk for injury:
  - Evaluate the patient carefully before allowing the patient to ambulate alone
  - Notify the primary health care provider before the next dose is due if drowsiness is severe
  - Assist with ambulatory activities if drowsiness does occur

# Nursing Process: Implementation #6

## Educating the patient and family:

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- Develop an effective teaching plan for the patient and family
- Explain that treatment for the disorder includes drug therapy, as well as other medical management
- Emphasize importance of not taking any nonprescription drugs unless their use has been approved by primary health care provider

# Nursing Process: Evaluation

The therapeutic drug effect is achieved

Adverse reactions are identified, reported to the primary health care provider, and managed using appropriate nursing interventions

The patient verbalizes the importance of complying with the prescribed therapeutic regimen

The patient and family demonstrate an understanding of the drug regimen

# Question #1

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Is the following statement true or false?

A variety of drugs are used to treat musculoskeletal injuries and disorders.

# Answer to Question #1

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True

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A variety of drugs are used to treat musculoskeletal injuries and disorders; they include DMARDs, bone resorption inhibitors, skeletal muscle relaxants, and uric acid inhibitors.

# Question #2

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Is the following statement true or false?

Patients using DMARDs have specific drug routines to follow to prevent gastroesophageal irritation.

# Answer to Question #2

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False

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Patients using DMARDs should be monitored carefully for infection; those taking bisphosphonates have specific drug routines to follow to prevent gastroesophageal irritation. When using uric acid inhibitors severe rashes should be monitored.