Massage Therapy & Medications Part I

Course Outline

Duration	LESSON TOPICS
10 hours	Welcome & Course Introduction Instructor & Student Expectations Attendance, Late, and Assignment Policies
1 hr	1. Explain the implications of how medications are administered and the effects of a massage therapy treatment.
1 hr	2. Explain the basic mechanism of action and therapeutic indications.
1 hr	3. Recognize the medications that may contraindicate a massage therapy treatment, either locally or generally.
1 hr	4. Understand how treatment can be adapted in cases where a pharmaceutical drug may complicate a proposed treatment plan.
12 hrs	5. Identify for common drugs the therapeutic uses and effects as appropriate for the following: • Inflammatory Conditions • Pain • Cardiovascular Disease • Diabetes • Respiratory inflammation and congestion • Mood and emotional disorders • HIV/AIDS

Course Outline

- Evaluation
  - Attending classes, participating in class discussions and completion of in-class assignments
- Final Exam

Introduction to Pharmacy

- To protect the health and well being of the public by ensuring and promoting safe, patient-centred and progressive pharmacy practice
  - From the College of Pharmacists of Manitoba (CPhM)

- Provide medications and advice to patients to help in the management of their medical condition(s)
- Promote safe and effective use of medication
- Provide patient-centred care
  - Involve the patient in their own treatment options
- Improve quality of life

A History of Pharmaceuticals

Archaeological evidence from societies around the world and to the most ancient of times show evidence of using substances, primarily plants, in a medicinal way. For example, studies on the teeth of Neanderthal skeletons from 40,000 years ago show they chewed bark from poplar trees, which contains an aspirin-like compound.

Ancient Egyptians (3000 BCE - 300 BCE) wrote down many recipes to treat a variety of ailments, using ingredients including honey, pomegranate juice., animal dung & some metals.

The Chinese wrote an early textbook of medicines in 2700 BCE containing an extensive list of 365 plants and dried animal parts used medicinally, many still in use today.

Around 1000 BC, the Sushrita Samhita, a foundational text of Ayurvedic medicine is created & includes 700 medicinal plants with descriptions of their use, dosage & safety.

In Ancient Greece (460 - 370 BCE) live Hipocrates, considered the father of modern medicine. His paper contain 300 medicinal plants, classified by their medicinal action.

In 77 AD De Materia Medica is written by Dioscorides, a Greek physician. This book forms the basis of knowledge of medications for the next 1500 years & includes about 1000 natural product medications (mostly plant based)

Modern Age of Pharmaceuticals

1100-1200s- first apothecary (pharmacy) set up in Florence, Italy.

1500-1600s - Apothecaries (pharmacists) produce many custom made medicines for patients

1798 - Smallpox Vaccine discovered

1820 - First US Pharmacopeia produced, listing drugs such cinchona bark used for malaria & guaiacum for coughs.

1827 - Morphine isolated from Opium poppies

1846 - Ether used as an anesthetic

1884 - Medications begin to be produced in factories rather than apothecary shops. First tablets produced, enteric coating developed, gelatin capsules mass produced.

1899 - Aspirin made by the Bayer Co.

1923 - Insulin discovered by Banting and Best, produced by Eli Lilly Co

Post WW1 growth of the Pharmaceutical Industry

The widespread suffering of WW1 encouraged the development of many medical advances.

1928 - Antibiotic Penicillin discovered by Alexander Fleming. Antibiotics were not widely prescribed until 1942.

1940s - Chemotherapy agents first developed, based on mustard gas used in WW1

1949 - First Corticosteroid approved for Rheumatoid arthritis.

1951 - First antipsychotic , Thorazine.

1960 - First Birth Control Pill approved by the FDA.

1987 - First statin, Lovastatin, available to treat high blood cholesterol.

1988 - First SSRI, Fluoxetine, introduced for treatment of depression & anxiety.

1990 - AZT & First Protease inhibitors developed to treat HIV/AIDS

1990s - Ritalin, a stimulant developed in the 1960s, begins to be prescribed for kids with ADHD

1998 - Viagra first sold for ED.

1998 - First Biologic (Enbrel) approved for autoimmune conditions, such as Rheumatoid Arthritis

Basic Concepts and Guidelines

Why Massage Therapists Need to Know How Medications Work

- Different work settings will require knowledge of **pharmacology**
  - Ex. Injury rehabilitation, palliative care
- Different medical professions will overlap
  - Ex. Pharmacists have expertise in medication use, but we have knowledge in the areas of diagnosis, prescribing and vaccination
- Most of your clients will be on one or more medications!!!
  - Inflammatory conditions, pain, cardiovascular disease, diabetes, respiratory inflammation and congestion, mood disorders, HIV/AIDS
  - Medications can affect or contraindicate massage therapy
- A basic understanding of pharmacology is necessary

What is Pharmacology?

- Pharmacology is “the study of the action of chemicals on living organism to produce biological effects”[1]
- Pharmacology encompasses the following areas:
  - **Pharmacokinetics**
    - How the body affects the drug (ADME)
  - **Pharmacodynamics**
    - How the drug affects the body (therapeutic and unintentional effects)
  - **Pharmacy practice**
  - **Toxicology**
    - Side effects and toxic effects

…What about massage therapy?

- Massage therapy is “the manipulation of the soft tissues of the body for a therapeutic response”[1]
  - Direct manipulation, hydrotherapy, aromatherapy, etc.
- Pharmacy uses drugs to effect physiologic and/or psychological changes in the body whereas massage therapy uses other physical modalities
  - Drugs ≈ Hands
- Medications and massage examples (page 12-13):
  - Muscle relaxants (Flexeril, Baclofen and Robaxacet) and manual manipulation
  - Corticosteroids and connective tissue such as skin, muscles and ligaments
  - Heart medications and heat therapy
    - 1000 Ways to Die
  - Anticoagulants and bruising

Take-Home Message

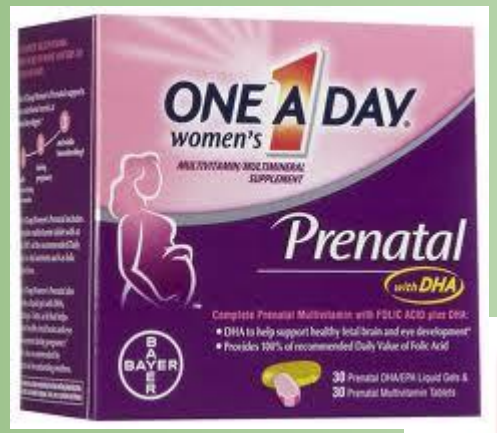
- Patients are more commonly combining conventional medicine with unconventional medicine (many do not communicate this to their MDs)

- Massage therapists need to have knowledge of:
  - Commonly used medications, how they affect the body and how they affect massage therapy
  - Drug information resources and databases
    - Don’t be discouraged – half of the battle is knowing where to look!
    - Lexi-Comp, Compendium of Pharmaceuticals and Specialties (CPS), other healthcare professionals, etc.
  - How massage can affect drug therapy

Common Pharmaceutical Terms and Concepts – Drug Names

- Generic name
  - Simple term that will reflect drug structure and the official chemical name
  - Example:
    - Generic name: diazepam
    - Official chemical name: 7 chloro- 1,3dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one ($C_{16}H_{13}ClN_2O$)
  - Some drugs may have multiple generic names (ie. acetaminophen/paracetamol are generic names for brand name Tylenol)
- Brand name
  - "The brand name is the registered trademark for a generic drug by a drug manufacturer"
  - Ex. Valium (diazepam)
  - Some drugs have multiple brand names (ie. Advil/Motrin)

Brand Name Products vs. Generic Products



Brand Name Products vs. Generic Products

- Brand name products and generic products are essentially the same thing!
  - Both contain the **EXACT SAME** active ingredient; sometimes the fillers used will differ
  - Generic products meet official requirements and are LESS EXPENSIVE
  - Exceptions: Ventolin/Salbutamol and Concerta/Methylphenidate
- Examples of brand and generic products:
  - Flexeril/Pms-cyclobenzaprine
  - Biaxin/Teva-clarithromycin
  - Centrum/Equate multivitamins
  - Samsung TV/Insignia TV
- Apotex (apo-), Teva/Novopharm (teva-/novo-), Pharmascience (pms-), Mylan (mylan-), etc.
- Patients generally know their medications by the BRAND NAME
- “NO SUB patients”
- Now for some fun ☺️

In-Class Assignment #1 – Brands and Generic Products (10 minutes)

- Find the GENERIC NAME for the following brand name products
  - Augmentin
  - Cipralex
  - Lipitor
  - Monopril
  - Zovirax
- Find the BRAND NAME for the following generic products
  - Apo-naproxen
  - Co-metformin
  - Mylan-nifedipine
  - PMS-citalopram
  - Rofecoxib
- HINT: use the GREEN pages in the CPS (“Brand and Generic Name Index”)

Common Pharmaceutical Terms and Concepts – Drug Classification

- Non-prescription drugs (over-the-counter medications)
- Prescription drugs (require a prescription)
- Targeted/Controlled drugs (ie. Benzodiazepines)
- Therapeutic properties
    - Similar therapeutic properties and used to treat the same disease such as antihypertensives to reduce blood pressure
    - Sub-classification: Drug Class/Pharmacologic category
        - ACE inhibitors: Ramipril, fosinopril, lisinopril, captopril, enalapril, quinapril
        - Other antihypertensive classes: beta blockers, ARBs, calcium channel blockers, diuretics
- Effect on a specific body system (ie. central nervous system)
- Chemical structure (similar to therapeutic properties)

Common Pharmaceutical Terms and Concepts – Uses or Indications

- An indication for a specific drug tells you what medical conditions the drug can treat (approved by FDA and Health Canada)
  - Ie. Ramipril is indicated in the treatment of hypertension
- Official indications vs. Off-Label Uses
- Off-Label Uses example
  - According to Lexi-Comp, GABAPENTIN is officially indicated in the treatment of epilepsy and postherpetic neuralgia[2]
  - Off-label, GABAPENTIN is prescribed to treat diabetic neuropathy, neuropathic pain and restless leg syndrome
- Based on a drugs mechanism of action, it can be used to treat several medical conditions (Ie. venlafaxine to treat depression, anxiety and OCD)

Common Pharmaceutical Terms and Concepts – Effects of Medications

- Therapeutic (desired) effect
- Side/adverse effects
  - Undesired effect in addition to the therapeutic effect
  - Sometimes related to the therapeutic effect, sometimes not
  - Ex. Amitriptyline, Benadryl
- Example: The therapeutic effect of amoxicillin is to resolve an ear infection for a young child. The side effects can include stomach upset and diarrhea.
- Drug interactions ☹
- Unpredictable effects:
  - Allergic reaction (localized rash, hives, facial/tongue swelling)
  - Idiosyncratic reaction (uncommon)
- Take-home: side effects could be the reason the patient presents (ie. Ramipril)

Common Pharmaceutical Terms and Concepts – Effects of Medications

- What are your experiences with medications?

- What are some factors that will affect the magnitude of therapeutic as well as adverse effects?

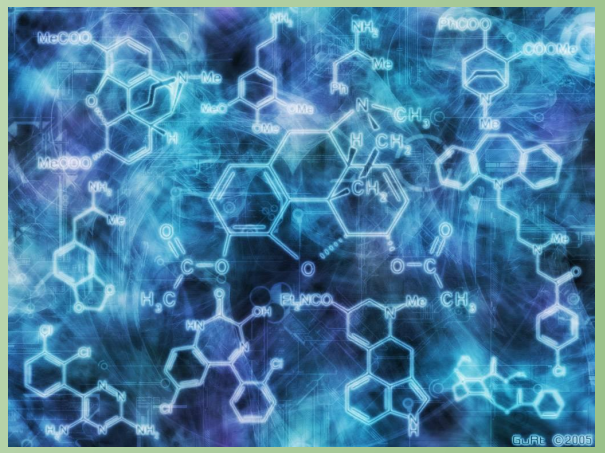
- Z-pak (SE), Tylenol No. 1 (codeine metabolism), Reactine (SE), Septra DS (allergy), Vitamin B12 and intrinsic factor

Common Pharmaceutical Terms and Concepts – Mechanism of Action (MOA)

- MOA is HOW the medication produces its therapeutic (and side) effect(s)
  - Can be very complex
  - According to Lexi-Comp, amoxicillin kills bacteria causing ear, sinus and throat infections by inhibiting cell wall synthesis. Without their cell wall, the bacterial cells will lyse or rupture.[2]
- Different mechanisms of action (page 22-23):
  - Interaction with receptors on cell membrane (“lock and key”)
  - Alteration of body fluids (ex. Tums)
  - Alteration of cell membranes (changes in permeability)
  - Interaction with enzymes outside the cell (ex. Ramipril)
- Take-home: MOA of a drug can tell you how it may affect massage therapy

Common Pharmaceutical Terms and Concepts

- Half-life
  - The amount of time it takes the body to decrease blood levels of a drug to HALF through metabolism and elimination
  - Each half-life reduces blood levels by 50 PERCENT (%)
    - Ie. 1st half-life 50% of the original amount of medication is gone, 2nd half-life 25% of the original amount of medication is gone, 3rd half-life 12.5% of the original amount of medication is gone, etc.
  - Pharmacists assume the drug is essentially eliminated after 5 half-lives (~97%)
  - Example: The half-life of lorazepam (Ativan) in adults is 14 hours
- Onset of action
  - Depends on route of administration
  - Example: Tylenol has an onset of action <1 hour (usually ~30 minutes)
- Half-life and onset of action can help you in scheduling of massage



Common Pharmaceutical Terms and Concepts

- Bioavailability
  - The amount of medication that actually makes it into the blood stream to give its therapeutic effect(s)
  - First pass effect
  - IV bioavailability is 100%, oral bioavailability is always less
    - Example: lorazepam oral bioavailability is 90%[2]
- Take home: Bioavailability is useful information. For example, a patient on IV pain relievers in hospital may not give reliable feedback regarding the depth of technique during a massage – could lead to more pain and bruising

- HINT: If you don't know, look it up! Databases, and other resources…even GOOGLE!!!

In-Class Assignment #2 – Avelox®
(10 minutes)

- What is the generic name of Avelox? Name two official indications.
- What class of drugs does Avelox belong to?
- If an adult patient takes Avelox 400mg (1 tablet) orally, how long will it take for the medication to be eliminated from the body?
- What is the IV bioavailability of Avelox?
- HINT: Information will be in the “Product Monographs” (*alphabetical)

How Drugs are Administered to the Body

- Different routes of administration include[1]:
  - Oral administration (tablets, suspensions/syrups)
  - Mucous membrane application (sublingual, inhaled medication, suppositories)
  - Topical application (ophthalmic, otic and skin products)
  - Parenteral (IV, IM, SC, dermal)
  - Implanted catheters and drug pumps
- Both **pharmacokinetic** and **pharmacodynamic** properties of the medication will be affected by the route of administration

How Drugs are Administered to the Body – Oral Administration

- Most common route of administration
- Generally, oral medication **dissolves** in the stomach and is absorbed into the bloodstream from the intestines tract after being swallowed
  - Exception to the rule: ENTERIC COATED TABLETS
  - EC ASA 81mg
- Therapeutic effect usually within 30-60 minutes
  - Limitless example
- Common oral preparations:
  - Capsules, tablets, syrups, suspensions
  - Liquids are absorbed into the blood stream faster. Why?
- Timed release/Controlled release/Slow release
  - Tylenol Arthritis 650mg

How Drugs are Administered to the Body – Application to Mucous Membranes

- Mucous membranes
  - Highly vascularized mucous-secreting cells that line internal surfaces of the digestive, respiratory, reproductive and urinary tracts[1]
    - What does vascularized mean?
    - Why would this route of administration have a faster onset of action?
    - What can we expect for bioavailability? (Hint – first pass effect)
- Systemic use example: angina and Nitrolingual spray/Nitrostat, asthma and Salbutamol metered-dose inhaler
- Common preparations:
  - Oral sprays, sublingual/buccal tablets, inhalers (MDI/diskus), nasal sprays, rectal/vaginal suppositories

How Drugs are Administered to the Body – Topical Applications

- Ophthalmic (eye) products
  - Sterile drops, viscous drops, gels, ointments
  - Preservatives and SE (blurred vision)
  - Examples: Visine, GenTeal, Refresh, Polysporin, etc.
- Otic (ear) products
  - Difficult to administer, uncomfortable
  - Examples: Cerumol (peanut oil), Locacorten Vioform

How Drugs are Administered to the Body – Topical Applications

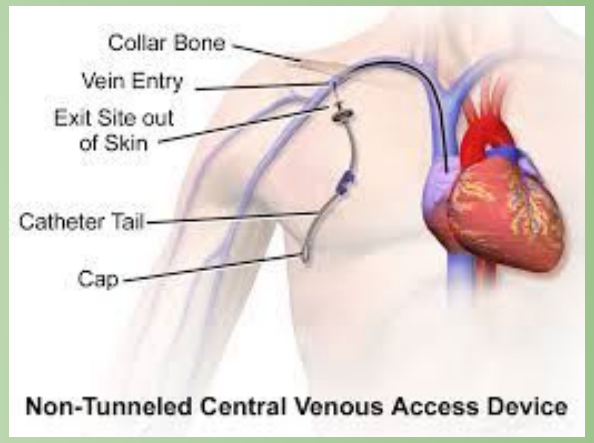
- Dermal products are medications that are applied topically to the skin
- Common preparations:
  - Creams, ointments, lotions, gels, patches
- Common uses:
  - Local use (ie. Infection prevention and treatment, moisturizers)
  - Treatment of muscle/joint pain
    - Products have limited use
    - Most common: VOLTAREN (OTC or compounded)
    - Counter-irritants = GARBAGE
  - Systemic administration of medications
    - Skin patches (Nitro-Dur, Evra, Nicoderm)
    - Other preparations (Estrogel, Androgel)

How Drugs are Administered to the Body – Parenteral Administration

- INJECTIONS (IV, IM, SC, dermal)
- Benefits of parenteral administration
  - Avoid first-pass effect (ie. Humulin N)
  - Rapid onset of action (ie. EpiPen)
  - Can be used for local treatment (ie. Depo-Medrol)
  - Patient cannot take oral preparations (ie. Vomiting)
  - Continuous administration (IV drip), vaccinations
- Table on page 32 (Key message: onset of action is rapid, except?)
- Common injection sites: abdomen, biceps, deltoids, quadriceps, buttocks (less common)

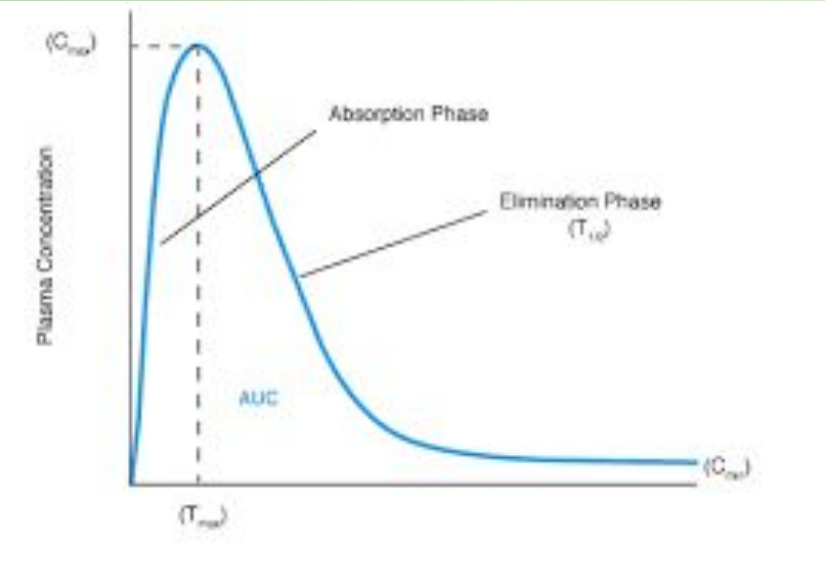
How Drugs are Administered to the Body – Implanted Catheters and Drug Pumps

- Not commonly seen!
- Used for ongoing injectable therapy or nutritional support
- Implanted catheter
  - Semi-permanent device that reduces the number of needles given to the patient for ongoing therapy
  - Example: Central venous catheter
    - Medical implant that delivers medication directly into circulation through a large vein, such as the right internal jugular vein superior vena cava heart
  - Archer example
- Drug Pumps
  - Example: Insulin pumps
- Take-home: You need to be aware of these devices and schedule massage appointments accordingly



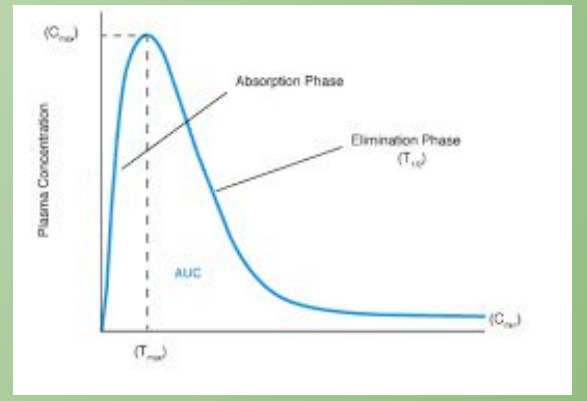
Drug Processing in the Body

- Pharmacokinetics: how the body affects the drug
- ADME
  - Absorption
  - Metabolism
  - Distribution
  - Elimination



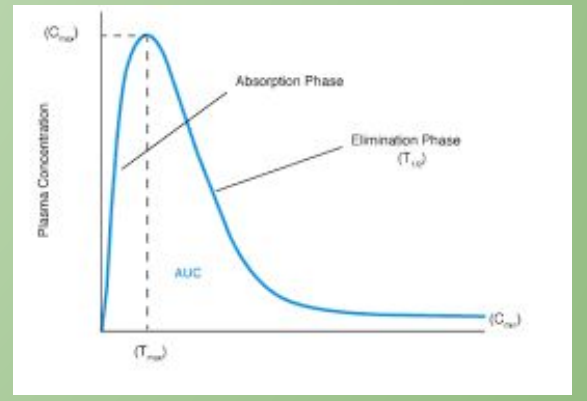
Drug Processing in the Body – Absorption

- An oral preparation is made of two components:
  - Active ingredient
  - Excipients (inactive ingredients)
    - Used to bulk up tablets, stabilize the product, flavour the product and ensure its dissolution/dissociation at the target location
    - Vary by manufacturer, can affect absorption
    - Recall “no-sub patients”
- A drug needs to be in solution to get absorbed into the bloodstream!
  - Many factors can affect a drugs absorption into system circulation including patient pathologies (ie. Vitamin B12 and intrinsic factor, Ulcerative colitis), pH of the drug, drug particle size, etc.



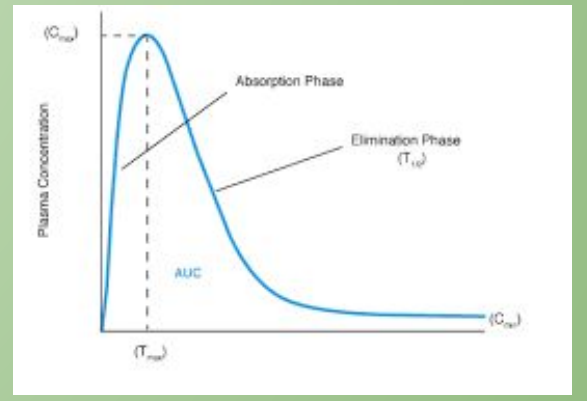
Drug Processing in the Body – Metabolism

- Drugs (parent compounds) are metabolized into drug metabolites
  - Inactive metabolites (common)
  - Active metabolites (can give therapeutic or adverse effects)
- The most imperative organ of drug metabolism is the LIVER!!!
  - Responsible for “first-pass effect”
  - Prodrug/Active drug absorbed from GI tract drug is carried to the liver (portal circulation) metabolized by liver enzymes drug enters general circulation
- Other sites of drug metabolism include the blood, lungs, skin, GI tract
- Prodrug require metabolism to become active and give the desired effect
  - Ie. Sulfasalazine for ulcerative colitis is metabolized by colonic intestinal flora to 5-ASA and sulfapyridine[2]
- Recall: Use of routes of administration other than oral to avoid first-pass effect



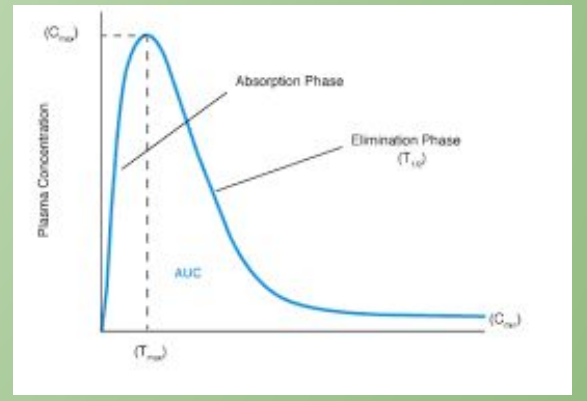
Drug Processing in the Body – Distribution

- After absorption, a drug is carried throughout the body via the BLOOD
  - It is DISTRIBUTED to target tissues and organs of excretion via the blood!
- Distribution is affected by the following factors:
  - Blood flow to organs (liver, kidneys, brain > adipose and muscle tissue)
  - Protein binding (affects bioavailability)
  - Blood brain barrier
    - Ie. The BBB is like a bouncer at a club



Drug Processing in the Body – Elimination

- Metabolism serves to inactivate medications and ready them for excretion
- Major organ of elimination – THE KIDNEYS
- Routes of excretion include:
  - Urine
  - Feces
  - Lungs
  - Sweat
  - Breast milk
    - An important question that pharmacists will ask their female patients: “Are you pregnant or breastfeeding?”
    - Reference: Drugs in Pregnancy and Lactation
- Hepatic and renal impairment



General Treatment Guidelines

- Recall from Chapters 1-4:
  - Many patients combine conventional and unconventional medicine
  - You will encounter clients taking medications that could impact massage therapy
    - Ie. Pain relievers can affect client feedback on massage
  - The patient's safety is always the top priority
- Carbamazepine example (page 43)
  - Monograph information
  - Blood dyscrasias and monitoring
  - What is one official indication for carbamazepine? When should we treat?
  - Measuring blood pressure and inquiring about adverse effects
  - When to seek medical attention

General Treatment Guidelines

- This important chapter focuses on decision making and provides guidelines for the following[1]:
  - Assessment
  - Treatment planning
  - Hydrotherapy
  - Therapeutic exercise prescription and client self-care
  - Treating around injection sites, skin patches and implant devices

General Treatment Guidelines – Guidelines for Assessment

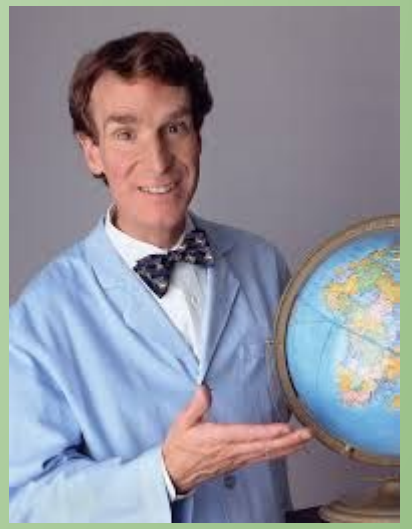
- Massage therapists need to distinguish between symptoms and adverse effects
  - Drugs can affect the client's complaints, case history taking, observation, palpation and movement examination
- The Client's Complaints:
  - Listen to your client! Let them tell you what is wrong!
  - Could their complaint be due to a medication? Referral to physician?
    - Dizziness/drowsiness, fatigue, headache, rash, muscle/joint pain
    - These can all be SIDE EFFECTS of medications!
  - Table on page 46

General Treatment Guidelines – Guidelines for Assessment

- Case History Taking:
  - General case history forms are great, however…
  - Medication case history forms
    - Determine all medications and indications
    - Clients may not tell you about their OTC medications, natural products, homeopathic “medications” and supplements
    - Helps to determine symptom vs. side effect, is a referral needed?
    - Identify “double-dosing” and ensure all physicians are aware of all medications
    - Helps with treatment planning
  - Example medication case history form on pages 48-49
    - Thoughts?

General Treatment Guidelines – Guidelines for Assessment

- Medication case history forms can prompt further investigation!!!
- Are several medications being prescribed for the same medical condition?
  - Ie. Hypertension
  - Taking more drugs increases the incidence of adverse effects and drug interactions
- One medication can be indicated for several medical conditions!
  - Ie. Gabapentin can be used to treat epilepsy and nerve pain
  - Knowing the indication can help with treatment planning (recall 4 slides ago…)
- Are long-term medications present?
  - Can suggest a more severe medical condition – is the condition stable?
- Long-term medications can cause liver, kidney and other pathologies
  - Ie. Corticosteroids and osteoporosis
  - Medications can cause dry skin, skin thinning, edema, joint pain, etc.
- Combining conventional and unconventional medicines
  - Drug interactions (known and unknown), effects on massage?



General Treatment Guidelines – Guidelines for Assessment

- Observation:
  - Visual assessment of the client
  - Facial expression (pain?), gait, posture, skin colour (edema?), physical deformities
- Example: A patient taking blood pressure medication (Adalat) comes in complaining about edema and you notice is having trouble walking.
  - What type of blood pressure medication is this? Side effects? Start date?
  - What is the primary cause of the abnormal gait?
  - Should the patient's physician be contacted? (Replace with another antihypertensive?)

General Treatment Guidelines – Guidelines for Assessment

- Palpation:
  - Changes (that have the potential to be caused by medications!) in muscle tone, tissue health, facial mobility, etc., can be detected by palpation
  - Ie. Injection sites in diabetes that are repeatedly used (can be painful or fibrotic), muscle relaxants, oral corticosteroids for long-term use (skin thinning)
- Movement examination:
  - Client performs movements to help determine which body structures are involved in the client's chief complaint
  - Ie. Risperidone (2nd generation antipsychotic) and Parkinsonian-like syndrome[2]
- Sample letter to physician on page 53 (similar to SOAP/DAP)
  - Careful wording…

General Treatment Guidelines – Guidelines for Treatment Planning

- Safe and effective massage therapy should complement conventional drug and other therapies the patient may be receiving
- Patients on medications may affect the following areas of massage therapy[1]:
  - Treatment scheduling
  - Focus and duration of treatment
  - Treatment techniques
  - The cooperativeness of the client

General Treatment Guidelines – Guidelines for Treatment Planning

- **Treatment scheduling**
  - Massage therapy must be scheduled around the patients medications, not medications scheduled around massage!
  - You cannot tell a patient when to take their medications! If they ask, refer!
- Important scheduling factors:
  - Medical stability of the client
    - Ie. Patients with epilepsy, diabetes, etc.
    - Schedule treatment AFTER the client's dose of medication (onset of action) so the client's medical condition will be more STABLE during/after massage and other treatments
  - Client feedback implications
    - Ie. Patients taking NSAIDS, narcotic pain relievers, CNS depressants
    - Reduced pain perception can lead to tissue damage and bruising
    - Schedule treatment JUST BEFORE OR SOON AFTER client's dose of medication so the client can give more reliable feedback about massage techniques – still use caution with pain medications
    - If you are not sure how to schedule massage with existing drug therapy, contact the MD!

General Treatment Guidelines – Guidelines for Treatmen Planning

- **Focus and Duration of Treatment**
- Client's energy level
  - When a patient is already taking medications that can cause fatigue, a SHORTER, MORE SPECIFIC TREATMENT is necessary. Why?
  - What drugs can cause this effect?
- Emotional stability of the client
  - In patients with anxiety and/or depression (primary or secondary – corticosteroids), ENDING TREATMENT EARLY or SHORTER TREATMENT may be necessary
  - Advisable to have this discussion prior to therapy (ie. medication case history form)

General Treatment Guidelines – Guidelines for Treatment Planning

- **Treatment Techniques**
  - The selection of manual techniques will be affected by several medications
  - Future chapters will elaborate on these general guidelines
- Medications affecting blood clotting:
  - Patients on Aspirin, Plavix, Warfarin, etc., will be at higher risk for bruising
  - AVOID/MODIFY trigger point therapy (ie. Deep kneading) and cross fiber frictions
- Medications affecting protective responses:
  - Patients on antidepressants, anxiolytics, narcotic pain relievers, muscle relaxants, etc., will not respond to massage techniques as expected, increasing the risk for tissue damage
  - CAUTIOUSLY USE/ELIMINATE deep tissue work and contract-relax stretching

General Treatment Guidelines – Guidelines for Treatment Planning

- **Treatment Techniques Con't**
- Medications that can compromise tissue integrity:
  - Long-term corticosteroid use can cause skin thinning, tendon/ligament weakening and osteoporosis!!! (ie. PREDNISONE)
  - AVOID/MODIFY direct pressure/stress on tissue structure techniques (ie. deep kneading, joint mobilization, muscle stripping, rib springing, etc.)
- Medications affecting pain responses:
  - Pain relievers and anti-inflammatories can mask pain, change client feedback, and lead to inappropriate therapy (ie. Risk of tissue damage and bruising)
  - USE CAUTION in these patients and use observation/palpation to determine appropriate therapy

General Treatment Guidelines – Guidelines for Treatment Planning

- **The Cooperativeness of the Client**
  - CNS depressants such as antidepressants, anxiolytics, narcotics, etc., (cause dizziness and drowsiness) can result in less communicative clients
  - Obtain frequent feedback and ask specific questions to ensure effective therapy

General Treatment Guidelines – Guidelines for Hydrotherapy

- **Hydrotherapy** is "the use of water in any of its three forms…used internally or externally for a therapeutic response"[1]
  - Because hydrotherapy is commonly used, we should understand how it can be affected by different medications our clients may be taking!
- Medications affecting blood vessel reactions to hot and cold:
  - Normally, vasodilation results from hot applications and vasoconstriction from cold applications
  - **Medications that cause vasodilation will contraindicate the use of heat hydrotherapy**
    - Ie. Antihypertensives, anti-ischemics, narcotic pain relievers
    - Heat hydrotherapy (hot-tub) will result in increased side effects like dizziness, headache, lightheadedness
  - **Medications that cause vasoconstriction will contraindicate all extreme temperature hydrotherapy**
    - Ie. Imitrex (migraines), Ritalin/Dexedrine (ADHD), cough and cold preparations (pseudo/ephedrine)
    - Due to the lack of temperature distribution throughout the tissue, hot applications can cause burns, while cold applications can cause spasm and pain

General Treatment Guidelines – Guidelines for Hydrotherapy

- Medications affecting skin sensitivity to temperature:
  - Skin may be less responsive to temperature changes in patients using topical muscle and joint products, long-term topical corticosteroids, CNS depressants, etc.
  - Increased risk of burns with hot applications
- Medications affecting body temperature control mechanisms:
  - Antipsychotics such as methotrimeprazine, perphenazine, prochlorperazine[2] can affect body temperature regulation
  - Heat therapy (sauna, hot bath, etc.) can cause nausea, confusion and muscle weakness due to the body's inability to cool itself (ie. Sweating)
  - Conversely, cold plunges are also contraindicated in these patients!

General Treatment Guidelines – Guidelines for Hydrotherapy

- Quick Guide to Hydrotherapy Case History Questions (page 61)
  - Blood pressure control with/without medication. Does the patient have low BP?
  - Normal bath/shower temperatures. What is well tolerated?
  - Areas of numbness or decreased sensation. Does the patient have diabetes?
  - Allergies? Pregnant?
- Quick Guide to Hydrotherapy Treatment Modifications (page 62)
  - Shorter treatment
  - Use local treatment rather than systemic
  - Temperature modifications
- If a client reacts adversely to hydrotherapy (nausea, headache, dizziness), stop treatment and allow client to rest in a neutral temperature environment with room temperature water to sip on. Severe reactions warrant immediate medical attention!

General Treatment Guidelines – Guidelines for Therapeutic Exercise Prescription and Client Self-Care

- "The overall goal of any exercise or self care program is to return the client to normal pain-free activities of daily living (ADLs)."[1]
  - You may be working with other HCPs, physiotherapists and exercise trainers
- Signs of exercise intolerance:
  - Difficulty breathing, chest pain, palpitations, nausea, vomiting, dizziness, etc.
- Exercise program basics
  - Monitor client response with no more than 1-2 activities at a time
  - "Start low and go slow" – progressive exercise plan
  - Involve your client in building an exercise plan around their lifestyle!
- Exercise regimens can also be impacted by drugs…

General Treatment Guidelines – Guidelines for Therapeutic Exercise Prescription and Client Self-Care

- Medications can affect exercise frequency, intensity and duration:
  - Medications that cause joint/muscle pain, fatigue, dizziness/drowsiness and can negatively impact exercise programs
    - Ie. Lipitor, Lopressor, Elavil
  - Muscle relaxants and pain relievers carry increased risk of injury or re-injury with exercise programs
  - Ensure that medication side effects are accounted for when creating a program
- Medications can affect exercise scheduling:
  - Certain medications can cause photosensitivity for patients (ie. Acne products, antibiotics)
  - **Recall medications affecting body temperature control mechanisms
  - Advise these clients to exercise in the morning or in the evening or indoors

General Treatment Guidelines – Guidelines for Therapeutic Exercise Prescription and Client Self-Care

- Exercise affecting a client's medical stability:
  - Patients with Type I Diabetes Mellitus – moderately intensive exercise tends to decrease sugar levels, while intense activity, likely a stress response, may increase sugar levels (Therapeutic Choices 6th Ed.)
    - Textbook discussion…
    - Be cautious and refer questions to the MD
  - Patients with asthma and their triggers – cold air/water, pollen, air pollutants, moulds, animals, EXERCISE, etc., can all trigger an asthma attack
    - EXERCISE caution!

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices

- There is a lack of knowledge regarding the implications of treating on or around injection sites, skin applications and implant devices
- It is safe to assume that massage therapy (including hydrotherapy) can have an effect on drug pharmacokinetics of injection sites and skin patches
- The two main objectives of this section are as follows:
  - Learn to make an assessment of the medication site (helps determine is treatment is appropriate)
  - Learn to recognize possible medication site adverse reactions

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Assessment

- **Case history questions**
  - Indication for medication, site location, adverse effects, sensation abnormalities, infection history?
  - For injection sites; injection frequency, site rotation, self-administered, IV/IM/SC?
  - For skin patches; length of use, changed regularly?
- **Observation**
  - At medication site, is there the presence of irritation/inflammation, bruising, discolouration?
  - Is the client apprehensive about treating around the site?

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Assessment

- **Palpation**
  - DO NOT palpate directly over the site, but palpate AROUND it
  - Identify site boundaries, assess for presence of edema and abnormal sensation
  - Is there dense/fibrotic tissue present around the site? Any pain in surrounding muscles?
- **Movement Assessment**
  - Assessment of active range of motion, passive range of motion and resisted range of motion at the site
  - Discontinue assessment if pain is present – refer client to their physician

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Assessment

- **Possible medication site adverse reactions**
  - Local injection site reactions (redness, tenderness, minor swelling, warmth)
  - Thrombophlebitis with IV injections (irritation to vein wall causing local edema, inflammation and discomfort)
  - Allergic reactions and infection risk with implanted devices
  - Allergic reactions with skin patches

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Clinical Guidelines

- **General guidelines**
  - Before each treatment, assess the site!
    - Redness/irritation? Leave it alone!
    - Infection present? Is it being treated?
  - Exercise caution when sensory abnormalities are present. Monitor client response closely!
  - When practicing in a hospital or care home, ensure all HCPs are aware of the treatment
    - Follow all institutional guidelines
    - Do not tamper with or remove IV lines, electrodes, etc.
    - If you are sick, reschedule your appointment!

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Clinical Guidelines

- **Injection sites**
  - Local massage is contraindicated in patients with thrombophlebitis until the physician gives permission to do so (embolism risk)
  - Avoid local massage in patients with IM injections until muscle tissue is no longer sore/inflamed (several days)
  - Local massage of sites given short-acting injections (ie. vaccinations) can be safely offered usually in 1-2 days
  - Local massage of long-acting injection sites (ie. depot injections such as Risperdal Consta, Depo-Provera, Depo-testosterone, etc.) is contraindicated until the medication is gone from the site – contact the client's physician!
  - Massage is contraindicated in infants with fever secondary to immunization

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Clinical Guidelines

- **Injection sites con't**
  - Do not treat injection sites that are painful!
  - Start low and go slow (light work hydrotherapy/deeper techniques) in clients with fibrotic injection sites from repeated use. Advise the client to monitor the area post-treatment.
    - Ie. Patients with diabetes
  - Hot/Cold hydrotherapy applications over injection sites can affect medication uptake into the bloodstream through vasodilation/constriction leading to side effects or less effective treatment
    - Ie. Patients with diabetes
    - Not sure about treatment? Contact the client's physician!

General Treatment Guidelines – Guidelines for Treating Around Injection Sites, Skin Applications and Implant Devices – Clinical Guidelines

- **Implanted devices**
  - Do not work within a 4-6 inch radius of the implanted device and ensure good hygiene practices to decrease risk of injection!
  - Contact client's physician with any questions/concerns
- **Skin patches**
  - Do not work within a 4-6 inch radius of the skin patch!
  - NEVER manipulate or remove a patch!
  - Be aware of all the client's medication patches and never touch the medicated side of the patch!
- Summary of General Massage Therapy & Medications Guidelines (pages 74-75)
  -

Commonly Prescribed Medications and Treatment Planning

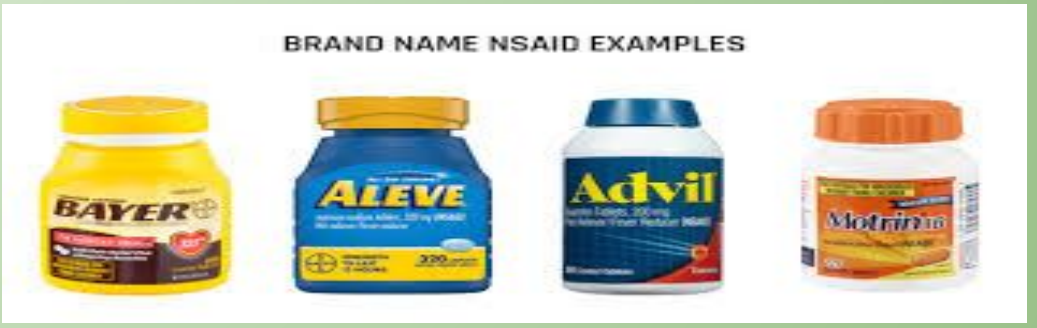
Chapter 6: Drugs for Managing Pain and Inflammation

Drugs for Managing Pain and Inflammation – Introduction

- Popular family of medications in Canada and the United States
- In 1997, Canadian sales for over-the-counter pain relievers was an estimated $215.9 million![1]
- Common classes of medications your clients may be taking include:
  - Non-steroidal anti-inflammatory drugs
  - Narcotic pain relievers
  - Skeletal muscle relaxants
  - Corticosteroids
- Discuss counter-irritants topical products including Zostrix, Tiger Balm and Rub A535, Bengay, etc.

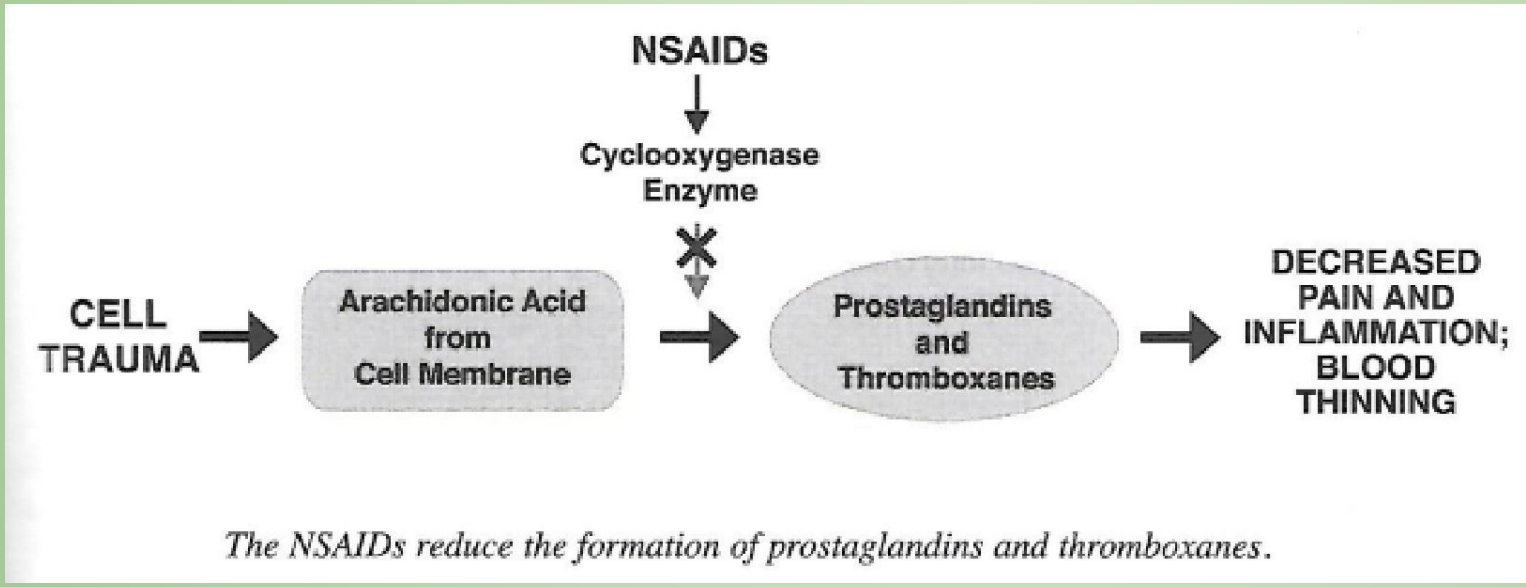
Drugs for Managing Pain and Inflammation – NSAIDs

- NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (name is self-explanatory)
  - Indicated for the treatment of mild to moderate pain/inflammation and fever
    - Ie. Ibuprofen, aspirin (acetylsalicylic acid), naproxen, diclofenac, indomethacin, tiaprofenic acid
  - Different from Tylenol (acetaminophen) – no anti-inflammatory properties
- NSAIDs are used to treat the following medical conditions:
  - Osteoarthritis/Rheumatoid arthritis
  - Headache, toothache, cough and cold
  - Cardioprotection



Drugs for Managing Pain and Inflammation – NSAIDs

- Mechanism of action of NSAIDs (Aspirin, Ibuprofen, Naproxen etc)[1]



The NSAIDs reduce the formation of prostaglandins and thromboxanes.

Drugs for Managing Pain and Inflammation – NSAIDs

- Mechanism of action of NSAIDs con't
  - The same prostaglandins that are blocked by NSAIDs are important in normal kidney function as well as stomach protection
    - This is why NSAIDs can cause stomach irritation and kidney issues!
  - Thromboxanes are responsible for blood clotting ASPIRIN is a cardioprotective medication used post-MI to prevent future blood clots
- Common side effects of NSAIDs[2]:
  - Stomach upset, abdominal pain, nausea, diarrhea, headache, drowsiness (rare)
  - Risk of GI bleed/ulcer (especially when combined with other medications – DRUG INTERACTIONS)
- Note: Don't try to memorize the side effect tables in the text! Know common side effects of the medications and when in doubt – look it up!

Drugs for Managing Pain and Inflammation – Narcotic Pain Relievers

- Narcotic pain relievers are also known as the OPIATES/OPIOIDS
  - Indicated for the acute or long-term treatment of moderate to severe pain
    - Ie. Morphine, fentanyl, oxycodone, hydromorphone, methadone
  - These narcotics all have the potential for misuse/abuse and are covered under the M3P program in Manitoba
    - Strictly regulated; triplicate prescriptions expire in 3 days!
    - Exception: Tylenol #1 (codeine 8mg, caffeine and acetaminophen) – schedule 2 medication
  - The opioids are used to treat the following:
    - Acute injuries
    - Chronic pain conditions
    - Surgery, terminal disease (Ie. cancer)

Drugs for Managing Pain and Inflammation – Narcotic Pain Relievers

- Mechanism of action of opioids
  - Narcotic analgesics mimic our own natural opiates (endorphins, enkephalins, dynorphins) produced in the body, binding to opioid receptors on cells in the brain, spinal cord and peripheral nerves, which decreases pain
    - Central (CNS) action – pain perception decreased, drowsiness, respiratory/vasomotor/cough reflex centers are depressed
    - Peripheral action – analgesia by affecting neurons at the injury site, GI peristaltic motility decreased
- Common side effects of opioids[2]:
  - Dizziness/drowsiness, headache, nausea, vomiting, constipation, hypotension, tachycardia, euphoria
  - Severe: respiratory depression, circulatory depression/shock (vasodilation), delirium

Drugs for Managing Pain and Inflammation – Skeletal Muscle Relaxants

- Commonly, pharmacists will counsel patients on the use of muscle relaxants for sports injuries as well as lower back pain secondary to activities including gardening, moving furniture, etc.
- Skeletal muscle relaxants are indicated for the treatment of:
  - Muscle spasm (involuntary muscle contractions that cause pain/inflammation and a decreased range of motion)
  - Spasticity (damage to the CNS from medical conditions including MS, stroke and spinal cord injury resulting in muscle spasm, clonus, fixed joints, etc.
    - Leads to compromised movement and speech
  - Centrally acting muscle relaxants are used to treat muscle spasm secondary to acute injury/inflammation, whereas peripherally acting muscle relaxants are used to treat spasticity secondary to chronic medical conditions
    - Why can't we treat spasticity centrally?
  - Ie. **Baclofen**, cyclobenzaprine, methocarbamol, dantrolene

Drugs for Managing Pain and Inflammation – Skeletal Muscle Relaxants

- Mechanism of action
  - Centrally acting agents reduce muscle tone via sensory/motor impulse depression in the brain and spinal cord (ie. Cyclobenzaprine, baclofen)
    - General CNS depression will also produce muscle relaxation (ie. Robax, Valium)
  - Peripherally acting agents reduce muscle tone directly in the muscle tissue (ie. Dantrolene) or the neuromuscular junction (ie. Succinyl-choline)
  - Regardless, decreased muscle tone leads to fewer muscle spasms and therefore, less pain experienced by the patient
- Common side effects of skeletal muscle relaxants[2]:
  - Dizziness/drowsiness, dry mouth, nausea

Drugs for Managing Pain and Inflammation – Corticosteroids

- The adrenal glands (location?) are responsible for the production of two distinct classes of hormones in the body:
  - Glucocorticoids – control metabolism, inflammation, immune response (ie. Cortisol)
  - Mineralocorticoids – control fluid/electrolyte balance (ie. Aldosterone)
- Corticosteroid medications are synthetic glucocorticoids that are used to suppress immune/inflammatory responses associated with certain medical conditions
  - Reduce symptoms rather than cure the condition
  - Physiologic doses (replacement therapy)
  - Pharmacologic doses (suppress inflammation and immune response)
- Long-term treatment (>3 weeks) is associated with increased side effects and risk of adrenal gland dysfunction (ie. Cushing syndrome and secondary adrenal insufficiency)

Drugs for Managing Pain and Inflammation – Corticosteroids

- Corticosteroids are indicated in the treatment of MANY medical conditions:
  - Rheumatoid arthritis, ankylosing spondylitis, gout, tendonitis, allergic rhinitis, eczema, anaphylaxis, psoriasis, ulcerative colitis, sthma/COPD, tran
  - PREDNISONE, pr methasone, hydro

Drugs for Managing Pain and Inflammation – Corticosteroids

- Mechanism of action of corticosteroids
  - Interact with the cell nucleus affecting protein synthesis (ie. enzymes, messengers, structural proteins) to produce 4 effects:
    - Anti-inflammatory – suppresses production of prostaglandins/leukotrienes, histamine, kinins (pro-inflammatory)
    - Immunosuppression – interferes with white blood cells to decrease immune response
    - Catabolic effects on connective tissue – liver gluconeogenesis via body tissue protein/fat breakdown
      - Can lead to breakdown of muscle, bones, joint capsules, etc.
    - Other effects – edema, mood changes, osteoporosis
- Common side effects of corticosteroids
  - Short term: indigestion/nausea, insomnia
  - Long term: hypertension, diabetes, skin thinning, tendon injury, easy bruising, weight gain, glaucoma, osteoporosis, adrenal gland dysfunction, increased risk of infection, slower healing

Drugs for Managing Pain and Inflammation – Quick Guide to Case History Taking

- Questions to ask:
  - What is the quality/intensity of pain (burning, stabbing, deep, dull, achy, etc.)? Is pain/inflammation local or generalized?
  - What medications (RX/OTC/herbal) are being used for treatment?
  - What makes the pain better and worse? Any other different therapies tried?
  - Any sensory impairment that might affect massage?
- Observations to make:
  - Normal gait? Pain observed while walking (ie. facial expression)?
  - Does the client need help taking off shoes/coat?
  - Are there signs of inflammation/injury present?

Drugs for Managing Pain and Inflammation – Quick Guide to Working with Clients Who Have Pain/Inflammation

- Ensure that the patient is comfortable! Elevate swollen areas and support injured areas with pillows.
- Pay attention to skin integrity as well as the underlying tissue. It could be damaged or have sensation abnormalities!
- Generally, massage will aid in the reduction of pain, however, chronic pain/inflammation conditions are changing constantly. One day massage therapy may be effective and another day, light work could cause intense pain. Communicate with your clients!
- Always ask for client feedback regarding pain/depth of pressure but understand that it may not be reliable!

Drugs for Managing Pain and Inflammation – General Massage Guidelines

- Be aware of all the client's medications (RX/OTC/herbal). Pain medications (including some topical products) reduce pain perception and make client feedback less reliable!
- Schedule treatments just before or soon after pain medication is taken to ensure more reliable client feedback, which prevents additional pain/bruising!
- Massage can amplify medication side effects such as dizziness/drowsiness and postural hypotension! Take this into consideration when determining treatment duration and intensity (ask your client how they feel after the massage).
- After lying down on the massage table for an extended period of time, sit up slowly and wait for a few minutes before standing.
- Local massage is contraindicated when skin irritations are present.

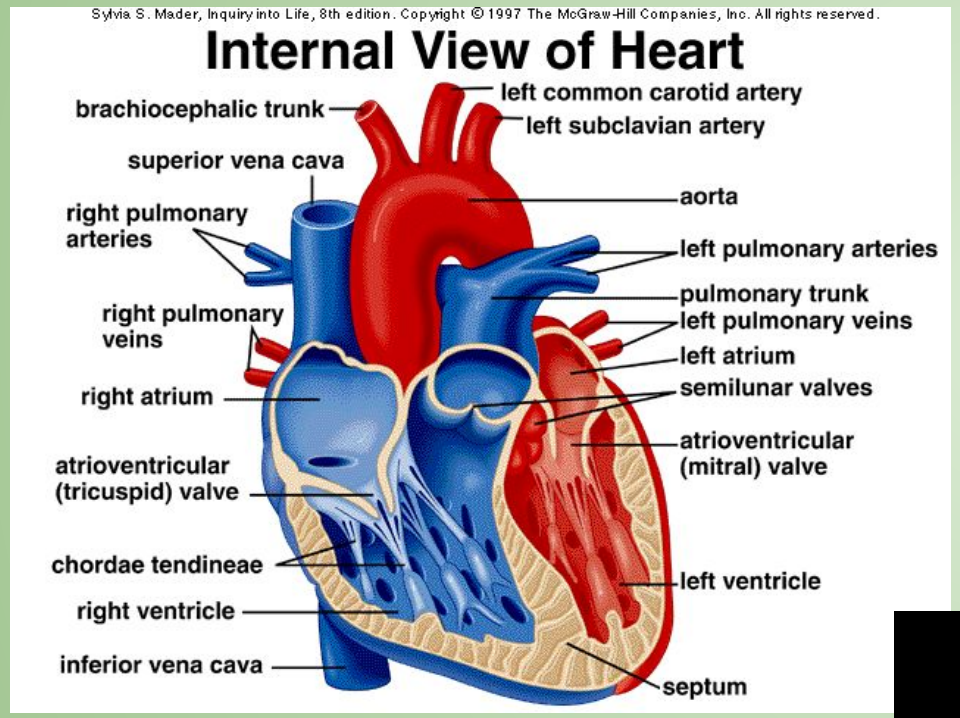
Drugs for Managing Pain and Inflammation – Specific Guidelines

- NSAIDs
  - Pain reliever and possible anticoagulant effect (caution regarding feedback and increased risk of bruising)
  - Abdominal massage and hydrotherapy are contraindicated in patients receiving care for GI conditions/side effects such as ulcers
- Avoid stretching techniques in clients that are taking muscle relaxants and opioid medications! Recall the cooperativeness of the client on CNS depressants!
- Corticosteroids
  - Avoid/modify techniques that put stress on bones, joints and muscles in clients who are taking long-term corticosteroids (ie. heavy tapotement)
  - Be especially careful with post-menopausal women and the elderly. Why?
  - Excellent hygiene is essential for patients on long-term corticosteroids because of their increased risk of infection. Why?

Drugs for Managing Pain and Inflammation – Specific Guidelines

- Hydrotherapy
  - Be aware of any physician restrictions on the use of hydrotherapy as well as client's tolerance of hydrotherapy. A hydrotherapy trial may be warranted.
  - Hydrotherapy is not recommended in patients taking CNS depressants because the medication side effects can be amplified by hydrotherapy.
  - Altered skin (temperature) sensitivity may occur in clients on long-term corticosteroids.
- Exercise
  - Start low and go slow with a progressive exercise plan (monitor the client)
  - Based on client response, make changes to exercise frequency, intensity and duration if necessary

Chapter 7: Drugs for Managing Cardiovascular Disease (Next Class!)



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