SELF-CARE: MUSCULOSKELETAL INJURIES AND DISORDERS

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Objectives

- Review the basic physiology of the musculoskeletal system
- Describe the difference between different injuries of the musculoskeletal system
- Differentiate between somatic pain and referred pain
- Discuss which type of patients should be considered appropriate to self-treat pain and those that should be referred to physician
- Discuss the various methods used to assess pain
- Review treatment options available for self-care of pain
- Evaluate patient cases to determine which medication option would be most appropriate.
- Review guideline update changes in regards to maximum dosing of acetaminophen
- Discuss topical therapy available for the self-treatment of pain
- Discuss appropriate indications, dosing, and safety issues associated with systemic medications
Introduction

- Types of Pain
  - Myalgia
  - Bones
  - Joints (arthralgia)
  - Connective Tissues
- Somatic vs. Referred pain
- Over-the-Counter (OTC) medications
Physiological Review

- Musculoskeletal System
  - Muscles
  - Tendons
  - Ligaments
  - Cartilage
  - Bones

- Somatic vs. Referred pain

- Signs of inflammation
  - Prostaglandin release
Etiology of Injuries

- **Muscle Injuries**
  - Strains
  - Contusions
  - Delayed-onset soreness
  - Systemic infections
  - Medications
Etiology of Injuries

- Tendons
  - Tendonitis

- Bursa
  - Bursitis

- Sprains
  - Issue with ligaments
    - First degree: excessive stretch
    - Second degree: partial tear
    - Third degree: total tear
Etiology of Injuries

- Strains
  - Issue with tendons

- Cramps
  - Many different theories
    - Inherited
    - Abnormal fluid balance
    - Abnormal electrolyte concentrations
    - Extreme heat or cold
    - Abnormal spinal reflex activity
Etiology of Injuries

- Lower back pain
  - Most common causes
    - Sedentary lifestyle
    - Poor posture
    - Improper shoes
    - Excessive body weight
    - Poor mattress
    - Sleeping posture
    - Improper lifting technique
Etiology of Injuries

- Joint pain
  - Gout
    - Increase in uric acid production
    - Decrease in uric acid elimination
  - Rheumatoid Arthritis
    - Flare and remission
  - Osteoarthritis
    - Gradual softening of cartilage
    - Can be treated with OTC medications
Signs and Symptoms of Injury

- Pain
  - Acute vs. Chronic
- Visible deformity
- Sensations of hot or cold
- Weakness
- Unable to perform activities of daily living (ADL’s)
- Numbness/tingling
  - If nerves are involved
Complications

- Untreated pain
  - Further tissue damage
  - Bone/cartilage remodeling
  - Disability/Loss of function
  - Limitations of ADLs
Exclusions from Self-Treatment

Criteria for a medical referral

- Severe pain
- Pain that lasts >2 weeks
- Pain that continues for >10 days with OTC therapy
- Increase in intensity
- Change in type of pain
- Pelvic/abdominal pain
- Nausea, vomiting, or fever
- Visual deformity or limb weakness
- Third trimester of pregnancy
- Age ≤ 7 years old
- Pain ≥ 6 on the pain scale
Case Examples

- Eligible for self-treatment?
  - A mother brings her 4 year old child to your pharmacy to buy children’s strength acetaminophen. When she comes to the counter, you notice that the child has a flushed face, slight tremor, and damp hair. What do you do?
Case Examples

- Refer the mother and child to a doctor
  - The child is less than 7 years old
  - Showing visible signs of possible systemic infection
Eligible for self-treatment?

A 56 year old man comes to your pharmacy asking about an appropriate OTC pain reliever for his headache. When you ask the patient about his pain, he states that three days ago it was a mild headache not relieved by acetaminophen, but over the course of the three days, his headache has become unbearable and sometimes sees tiny stars in the periphery of his vision. What do you do?
Case Examples

- Refer the patient to a doctor
  - This patient is most likely experiencing a migraine
  - The change in the character of pain is concerning, especially that he is seeing stars (possibly an aura associated with a migraine)
  - OTC medications will not help with this condition
Case Examples

- Eligible for self-treatment?
  - A 27 year old female comes to your pharmacy asking where the pain relief aisle is located. Before you answer, you ask what type of pain she is experiencing. The patient states that she just finished a dodgeball tournament (which was aired on ESPN 8) and she took a ball to the face, resulting in her teams elimination. She complains of generalized pain and some swelling. What do you do?
Case Examples

- Console the patient for being the reason her team lost the tournament
- Direct her to the pain relief aisle and suggest an appropriate medication
  - Ibuprofen
Pain Assessment

- Inquire about the pain
  - PQRST
    - Precipitating factors
    - Quality of the pain
    - Region of the pain
    - Severity of the pain
    - Time-related

- Rate the pain
  - Pain Scale (0-10)
  - Faces Scale
Pain Assessment

- Faces Scale

![Faces Scale Diagram]

- 0: No Hurt
- 1: Hurts Little Bit
- 2: Hurts Little More
- 3: Hurts Even More
- 4: Hurts Whole Lot
- 5: Hurts Worst
Treatment Goals

- Decrease pain severity
- Decrease pain duration
- Minimize suffering
- Minimize functional limitations
- Prevent acute pain from becoming chronic

The primary indicator of pain relief is the patient perception of their own pain.
Treatment

- Nonpharmacological Therapy
  - RICE therapy
    - Rest
    - Ice
    - Compression
    - Elevate
  - Heat therapy
  - Physical therapy
Treatment

- **Topical therapy**
  - **Ideal topical therapy**
    - Easy to apply and remove
    - Nontoxic and nonirritating
    - Cosmetically acceptable
    - Homogenous
    - Bacteriostatic
    - Chemically stable
    - Pharmacologically inert
Treatment

- **Topical therapy**
  - *Methyl salicylate*
    - Rubefacients
  - *Camphor*
    - Cooling sensation
  - *Menthol*
    - Cooling sensation
  - *Methyl Nicotinate*
    - Vasodilator
  - *Capsicum*
    - Irritant
Treatment

- Common topical products
  - Absorbine Jr. cream (menthol)
  - Icy-Hot patch (menthol)
  - Capzasin-HP cream (capsicum)
  - Aspercreme cream (trolamine salicylate)
  - BenGay ointment (methyl salicylate/menthol)
  - JointFlex cream (camphor)
Treatment

- **Systemic therapy**
  - Aspirin
  - Acetaminophen
  - Non-Steroidal Anti-Inflammatory Drugs (NSAID’s)
    - Ibuprofen
    - Naproxen
    - Ketoprofen
Treatment

- **Aspirin**
  - **MOA**
    - Inhibit peripheral prostaglandin synthesis from arachidonic acid by inhibiting COX-1 and COX-2
    - Results in decreased sensitivity of pain receptors to the initiation of pain impulses
    - Also has some inhibition of platelet function
  - **Indication**
    - Mild to moderate pain
    - Mild to moderate fever
    - Prevention of thromboembolic events (MI/Stroke)
Treatment

- Aspirin
  - Dosing
    - Pediatric: 10-15mg/kg
    - Adult: 650-1000mg q4-6h (4000mg)
  - Safety issues
    - GI damage
    - Increased bleeding risk
    - Allergic reaction
    - Surgical interventions
    - Reye’s Syndrome
Treatment

- Acetaminophen
  - MOA
    - Inhibit central prostaglandin synthesis
  - Indication
    - Mild to moderate pain
    - Mild to moderate fever
  - Dosing
    - Pediatrics: 10-15mg/kg
    - Adults: 325-1000mg q4-6h (3000mg)
Treatment

- Acetaminophen
  - Safety issues
    - Toxicity
    - Reversal agents
    - Side effects
    - Drug interactions
Treatment

- **NSAID’s**
  - **MOA**
    - Inhibit peripheral prostaglandin synthesis from arachidonic acid by inhibiting COX-1 and COX-2
  - **Indication**
    - Minor headache pain
    - Common cold
    - Toothache
    - Muscle ache
    - Backache
    - Arthritis
    - Menstrual cramps
    - Mild to moderate fever
Treatment

- NSAID’s
  - Dosing
    - Ibuprofen
      - Pediatrics: 7.5mg/kg
      - Adults: 200-400mg q4-6h (1200mg)
    - Naproxen
      - Pediatrics: Not recommended under 12 years old
      - Adults: 220mg q8-12h (660mg)
    - Ketoprofen
      - Pediatrics: Not recommended under 16 years old
      - Adults: 12.5-25mg q4-6h (75mg)
Treatment

- NSAID’s
  - Safety issues
    - Toxicity
    - Side effects
    - Long-term use
    - Caution of use with comorbid disease states
  - Drug Interactions
    - Digoxin
    - Antihypertensives
    - Methotrexate
Special Populations

- Children <2 years old
  - Refer to pediatrician
- Pediatrics
  - Avoid aspirin, naproxen, ketoprofen
- Geriatrics
  - Use caution with all OTC pain medications
- Pregnancy
  - Avoid aspirin and NSAID’s
- Renal dysfunction
  - Avoid NSAID’s
- Liver dysfunction
  - Avoid acetaminophen
Conclusion

- Self-treatment of pain is not recommended for all patients
- Many different formulations are available
- Side effects and drug interactions are most important with systemic medications
- It is important to advise patients on the best choice of medication for their condition
- Just because a product is OTC does not mean it can be used without guidance
Questions?
References


- Lexi-Comp Online. 2011.