Pain Management for Musculoskeletal Disorders

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INTRODUCTION
Pain, both complex and perplexing, affects every person in the world at some time or other. Next to the common cold, pain is the reason patients seek a healthcare practitioner. One of the most prevalent, challenging, and influential problems facing modern society is chronic pain. Statistics related to the incidence of pain are amazing but do not tell the entire story, as many of those affected are family, friends, and employers of those experiencing the pain. While most individuals experience acute, mild to moderate pain, some individuals experience chronic, severe pain. The number of patients living with chronic pain is expected to increase with the aging population and with the rise in obesity and diabetes across the nation.

While it is true that patients do not die from benign pain, many patients suffer needlessly and experience a disabling and pleasureless existence. It substantially impacts a patient’s psychological, social, vocational, behavioral, and physical well-being. Some severely afflicted chronic pain patients sadly do not look forward to a long life; rather, they anxiously wait an end to their suffering. The impact of unrelieved chronic pain can result in a decreased quality of life, functionality, activity, appetite, productivity, earned wages, and a willingness to be compliant with medical therapy. It can also increase patient/family financial burden, hospital costs, the number and duration of hospitalizations, pain and suffering, and suicidal tendencies if the pain becomes intolerable.

Musculoskeletal pain affects the bones, muscles, ligaments, tendons, and nerves and can be acute or chronic. Anyone can experience musculoskeletal pain. It is most often caused by an injury to the bones, joints, muscles, tendons, ligaments, or nerves. Musculoskeletal pain can be either localized or widespread. Lower back pain is possibly the most common type of musculoskeletal pain; some of the other more common types of pain are listed in Table 1 and various causes of pain in Table 2.

SYMPTOMS
Symptoms of musculoskeletal pain depend on whether the pain is caused by an injury or overuse and whether it is chronic or acute. The symptoms can also differ from person to person. Patients with musculoskeletal pain sometimes complain that their entire body aches, their muscles...
may feel that they have been pulled or overworked, and sometimes the patient’s muscles may twitch or burn. Even though symptoms vary from person to person, the common symptoms are listed in Table 3.

### TABLE 1. Types of Pain.

<table>
<thead>
<tr>
<th>Bone pain</th>
<th>Muscle pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually deep, penetrating, or dull. It most commonly results from injury. It is important to be sure that the pain is not related to a fracture or tumor.</td>
<td></td>
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<tr>
<td>Often less intense than bone pain, but it can still be debilitating. Muscle pain can be caused by an injury, an autoimmune reaction, loss of blood flow to the muscle, infection, or a tumor. The pain can also include muscle spasms and cramps.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Tendon and ligament pain</th>
<th>Fibromyalgia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often caused by injuries, including sprains. This type of musculoskeletal pain often becomes worse when the affected area is stretched or moved.</td>
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<tr>
<td>A condition that may cause pain in the muscles, tendons, or ligaments. The pain is usually in multiple locations and can be difficult to describe. Fibromyalgia is usually accompanied by other symptoms.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Joint pain</th>
<th>“Tunnel” syndromes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint injuries and diseases usually produce a stiff, aching, “articular” pain. The pain may range from mild to severe and worsens when moving the joint. The joints may also swell. Joint inflammation (e.g., arthritis) is a common cause of pain.</td>
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<tr>
<td>Refers to musculoskeletal disorders that cause pain due to nerve compression; includes carpal tunnel syndrome, cubital tunnel syndrome, and tunnel syndromes. The pain tends to spread along the path supplied by the nerve and may feel like burning. These disorders are often caused by overuse.</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 2. Causes of Pain.

- Wear and tear
- Trauma
- Auto accidents
- Falls
- Fractures
- Sprains
- Dislocations
- Direct blows
- Postural strain
- Repetitive movements
- Overuse
- Prolonged immobilization
- Postural changes
- Poor body mechanics and others

### TABLE 3. Common Symptoms of Pain.

- Localized or widespread pain that may or may not worsen with movement
- Aching or stiffness of the entire body
- The feeling that your muscles have been pulled or overworked
- Fatigue
- Sleep disturbances
- Twitching muscles
- The sensation of “burning” in your muscles

### TABLE 4. Approaches to Treating Pain.

- Physical or occupational therapy, manual therapy
- Mobilization/immobilization
- Medications
- Strengthening/conditioning/stretching exercises
- Heat/cold
- Acupuncture or acupressure
- Relaxation/biofeedback techniques
- Osteopathic manipulation
- Chiropractic care
- Therapeutic massage

### TABLE 5. Analgesics.

#### OPIOID ANALGESICS
- Afentanil
- Fentanyl
- Hydrocode
- Hydromorphone
- Levo-Methadone
- Methadone
- Morphine
- Oxycodone
- Oxymorphone
- Ketorolac
- Sufenta
- Tapentadol
- Tramadol

#### OPIOID AGONIST-ANTAGONIST ANALGESICS
- Butorphanol
- Naltrexone
- Pentazocine

#### CENTRAL ANALGESICS
- Clonidine

#### SALICYLATES
- Aspirin
- Diflunisal
- Magnesium salicylate
- Methylsalicylate
- Salsalate

#### NONSTEROIDAL ANTI-INFLAMMATORY AGENTS
- Celecoxib
- Diclofenac
- Etodolac
- Fenoprofen
- Flurbiprofen
- Ibuprofen
- Indomethacin
- Ketoprofen
- Ketorolac
- Mefenamic acid
- Meloxicam
- Nabumetone
- Naproxen
- Oxaprozin
- Piroxicam
- Sulindac
- Tolmetin

#### OTHER
- Acetaminophen
- Capsaicin

### TABLE 6. Various Dosage Forms That Can Be Compounded for Individual Patients.

- Capsules/Tablets
- Gels/Creams/Dotiements/Sticks, Topical and Transdermal
- Solutions/Suspensions/Emulsions
- Sprays/Inhalations
- Gummy gels/Troches/Sublingual drops
- Suppositories/Inserts
- Injections/Intrathcals/Etc.

### TABLE 7. Compounded Formulations for Pain Management.

#### SOLUTIONS:
- Dexamethasone and Lidocaine Solution for Iontophoresis
- Morphine Sulfate 10-mg/mL Inhalation Solution
- Mepivacaine Hydrochloride 10 mg/5 mL and Promethazine Hydrochloride 10 mg/5 mL in Cherry Syrup
- TRANSDERMAL/TOPICAL GELS:
  - Ibuprofen 20% and Piroxicam 2% in Transdermal Base
  - Capsaicin and Ketorolac in Pluronic Lecithin Organogel
  - Cyclobenzaprine Hydrochloride 0.5% and Naproxen 10% in Transderal Base
- TOPICAL CREAMS:
  - Hydrocortisone 10% Cream for Phonoephoresis

#### MEDICATION STICKS:
- Analgesic Medication Stick with Capsaicin

#### TROCHES:
- Morphine Sulfate 15-mg Troche (#24, 1 troche)
- Buprenorphine 0.1-mg Troches (#24, 1 troche)

#### CAPSULES:
- Morphine Sulfate 15-mg and Dextromethorphan Hydrobromide 30-mg Capsules
- Codeine Phosphate 32.5-mg, APAP 325-mg, and Phenylpropanolamine Citrate 20-mg Capsules

#### INTRATHecal SOLUTIONS:
- Morphine Sulfate 30-mg/mL Intrathecal Solution
- Bupivacaine Hydrochloride 1.25-mg/mL and Fentanyl Citrate 20-mg/mL Injection for Ambulatory Pump Reservoir

### TABLE 8. Patient-Specific Compounded Medications

Over the last 10 years, the number of prescriptions that have been compounded for pain therapy has dramatically increased. A significant portion of these compounded analgesic preparations are made up of topical/transdermal dosage forms such as gels and creams.

The advantages of topical/transdermal formulations include:

1. Bypassing first-pass metabolism
2. Lower systemic toxicity
3. Ease-of-use and overall greater patient compliance

### TREATMENT

Musculoskeletal pain is best treated by treating its cause; this varies depending on whether the patient is experiencing bone, muscle, ligament, tendon, or joint pain, or some other kind of musculoskeletal pain.

Musculoskeletal pain can be treated by different approaches; Tables 4 and 5 list those approaches and also provide the typical drugs that can be used. Table 6 contains various dosage forms that are either manufactured or compounded.

Fibromyalgia patients can be prescribed medications to increase the body’s level of serotonin and norepinephrine (neurotransmitters that modulate sleep, pain, and immune system function), which may be prescribed in low doses.